

TECHNOLOGY DEPT:

ROADS AND STREETS

OCTOBER 1944

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DETROIT



Pacheco Pass Five Years Ago

You wouldn't recognize this place today; a modern highway now traverses Pacheco Pass, California, where Timken Bearing Equipped "Caterpillar" Diesel D8 Tractors, LeTourneau Bulldozers and Carryalls once worked to move 570,000 yards of rock and dirt.

The speed, dependability and endurance associated with Timken Tapered Roller Bearings in all kinds of American construction equipment on tough peace-time jobs are now helping to pave the way to Victory for United Nations' forces wherever they are engaged. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



ADAMS MOTOR GRADERS ARE *Easy to Start*



One of a series of ads on Adams motor grader features

ONE of the most appreciated features of Adams Motor Graders is the ease with which the engine can be started. The International Diesel engines used have built-in gasoline equipment which permits starting the engine with gasoline on low compression. As illustrated above, all the operator has to do is to pull up a conversion lever, press the starter button, and the engine starts immediately. (In the absence of electrical equipment, two or three quarter-turns of the hand crank do the trick.) After a brief warmup period, the operator pushes the conversion lever down, opens up his Diesel throttle and the

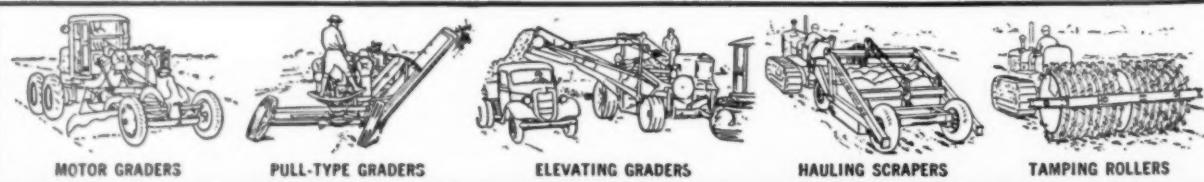
engine is raring to go as a full Diesel engine doing continuous hard work on an average of two gallons of low-price fuel per hour.

This feature saves time, trouble and tempers in cold weather though its simplicity makes it valuable in all seasons. Let your local Adams distributor explain this feature to you in more detail along with other Adams advantages which you will want in the next motor grader you buy.

J. D. ADAMS COMPANY • INDIANAPOLIS, IND.



At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.



ADAMS

★ ROAD-BUILDING AND ★
EARTH-MOVING EQUIPMENT

Why
B-E-T-H-L-E-H-E-M F-O-R-M-S-E-T
spells
E-C-O-N-O-M-Y

One of the greatest advantages of Form-Set (Bethlehem's preformed rope) is an inherent "bendability" that makes it ideal for use with small sheaves and drums, and where sharp reverse bends are necessary. As the preforming operation greatly reduces internal stresses and strains, Form-Set rope will naturally last longer—and do the job better—where highest resistance to bending fatigue is required.

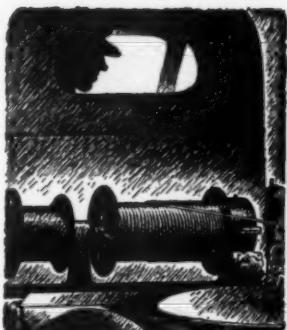
Increased rope life naturally means a saving of overhead. There's a cash value, therefore, in every extra day of Form-Set's life.

And that's not the only saving. The longer your ropes remain in service, the less your machines are "down" for rigging . . . the less productive time you lose.

These are a few of the solid reasons why Form-Set means overall economy in such a wide range of industries—industries that use power shovels, cranes, derricks, overhead air and electric hoists, and many other types of machinery.

Bethlehem makes wire rope in all standard grades and constructions, any of which can be supplied with the Form-Set feature. In addition, we maintain a staff of engineers whose business it is to work closely with you on wire-rope problems.

**When you think WIRE ROPE
 . . . think BETHLEHEM**



**TOMORROW'S SIGN FOR
TOMORROW'S HIGHWAY-TODAY
...with Scotchlite**

BELT LINE
T.H. 100 F

UNRETOUCHED NIGHT
PHOTOGRAPH TAKEN
AT 400 FEET



SIZE OF SIGN 4x8 FEET

• The high speed of tomorrow's traffic will not outrun your present traffic signs if you reflectorize with SCOTCHLITE. Over-all reflectorization is the answer and only with SCOTCHLITE is this efficiently and economically possible. SCOTCHLITE is the reflective sign material of tomorrow ready for use today to bring your present signs up-to-date in legibility, attention-value and 24 hour visibility. This material is available in flexible roll form and in white, yellow, silver or red colors. You'll find it easy to use—easy to maintain. Find out how SCOTCHLITE will fit into your sign program. Write today.

Scotchlite
REFLECTIVE SIGN MATERIAL 24 Hour Visibility

3-M PRODUCTS

MINNESOTA MINING AND MANUFACTURING CO.
GENERAL OFFICES, SAINT PAUL 5, MINN.
BRANCHES IN PRINCIPAL CITIES

ROADS AND STREETS

Vol. 87, No. 10

October, 1944

CCA

A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

HALBERT P. GILLETTE, President; EDWARD S. GILLETTE, Publisher; HAROLD J. McKEEVER, Editor; CHARLES T. MURRAY, Managing Editor; JOHN C. BLACK, Field Editor; LT. COL V. J. BROWN, Publishing Director (Absent on Military Duty); H. J. CONWAY, Advertising Editor; L. R. VICKERS, Promotional Director.

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**HIGH
WIDE...and
HANDSOME
Profits**

THREE big reasons for the outstanding performance of Lorain Draglines are (1) Balanced, big capacity turntable with Center Drive power transmission, engineered to develop higher hoist line speed and more "dirt-digging" pull and power—(2) Patented "cable-miser" Fair-lead that improves dragline operation, increases hours of cable life, reduces maintenance costs—

(3) Husky, 2-speed Chain Drive Crawler, easily maneuverable, agile and "sure-footed" in soft ground or cross-country travel.

Lorain Draglines—planned for postwar—will have many more advantages worth investigating. Be sure to see your Lorain distributor and discover why Lorain Draglines fill the bill for moving dirt HIGH . . . WIDE . . . and produce HANDSOME profits.

THE THEW SHOVEL COMPANY • LORAIN, OHIO

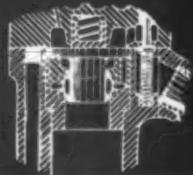
Reg. Trade Mark

thew-Lorain
CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

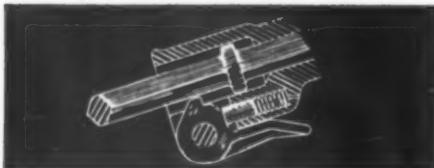
Thor No. 25 PAVING BREAKER



These THOR Features Speed Heavy Demolition Jobs!



• Positive Short-Travel Tubular Valve—Gets every ounce of power from every foot of air entering the machine. Actuates a block type piston that minimizes vibration to provide handling ease. Provides low air consumption.



• Latch Type Retainer—Simple, fast and easy to operate. Spring detent holds retainer in closed position . . . Pressing with the foot releases the tool. No adjustment is required during insertion of the tool.



• 4-Bolt Back Head—Special design maintains rigidity between the back head and cylinder, eliminating air leakage and excessive bolt breakage when machine is used for prying. Made of drop forged, heat treated alloy steel. Equipped with rubber grips that keep the handle cool at all times.



BUILT for Heavy Duty . . . DESIGNED for Fast, Easy Handling

The Thor No. 25 Paving Breaker is the heavy duty "boss" of the Thor demolition crew . . . *built* for the hardest kind of jobs, yet *designed* to provide handling ease that gets those jobs done faster.

Ruggedly built from alloy-steel drop forgings, equipped with a sturdy 4-bolt back head for maximum strength and rigidity, this heavy duty Thor Breaker combines *operating ease* with *power* to make quick work of the toughest demolition jobs in pavement, walls, columns, piers, foundations and the like.

For more information about this powerful, easy operating, heavy duty Thor No. 25 Paving Breaker and full details about light and medium duty Thor Breakers in the complete Thor line of contractors air tools write today for Catalog 42-A.

Thor

Portable Pneumatic and Electric Tools

INDEPENDENT PNEUMATIC TOOL COMPANY



600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

"DING HAO!"

(“EVERYTHING'S OKAY”)



SHOUTS of "Ding hao!" from grinning Chinese workers greeted B-29 fliers when they returned to China's air bases from their first bombing of the Nips' homeland. "Everything's okay!"... now that Allied bombs repay a long-standing debt. Forgotten are the toil, sweat and blood put into the superfortress fields.

But history will not forget. Recorded for all time is the seemingly impossible feat a half-million Chinese workers accomplished with bare hands and makeshift tools. Longer and more level than any previously constructed forward combat fields are China's vast system of B-29 strips — "so long that a

man at one end of the strip can scarcely distinguish a man at the other."

If only tractors with rollers, bulldozers and scrapers... motor graders and other construction tools could have been available!

A main part of the supplies of all Armed Forces, construction machines are being used IN FORCE, in every theater of war, where it is at all possible to ship, fly or truck them. Ingenuity and mass manpower is the only answer to their lack. Fortunately, China had both. We join in paying tribute to a brave nation. To their "Ding hao!" we say "MORE POWER"... on land as well as in the air... and it will come soon!

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

SPEED AND MOBILITY WITH CRUISER CRANE

Mounted on eight rubber tired wheels and driven directly from the crane engine, the "Cruiser Crane" can traverse long or short distances swiftly and easily. One man can operate the crane and drive it from job to job without leaving his seat in the operator's cab. This saves considerable time on jobs where frequent short moves back and forth are required. The "Cruiser Crane", because of its short turning radius and easy maneuverability works well in cramped quarters.

KOEHRING COMPANY Milwaukee 10, Wis.



If you have idle construction equipment, make it available for home front use, where it is urgently needed. Register all your idle equipment with the local office of the War Production Board.



HEAVY-DUTY CONSTRUCTION EQUIPMENT

LOOK AHEAD

WHEN YOU BUY

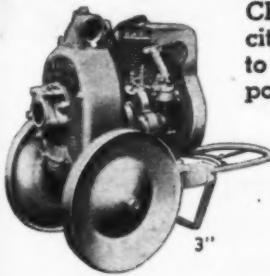
Guaranteed performance is
minimum performance for
JAEGER "Sure Prime" PUMPS



3000 Gallon "Bantam"

Contractors who watch their costs know there's a big difference between a Jaeger "Sure Prime" and an ordinary pump of the same size and rating. Jaeger Pumps are built to exceed their promises — deliver their rated capacity under tougher conditions, prime unfailingly and up to 5 times faster, assure you of thousands of extra hours of dependable cost-cutting service during the post-war building years ahead.

INDIVIDUALLY TESTED AND CERTIFIED for vacuum, capacity and pressure. Sizes 1½" to 10"; gas, electric or diesel power.



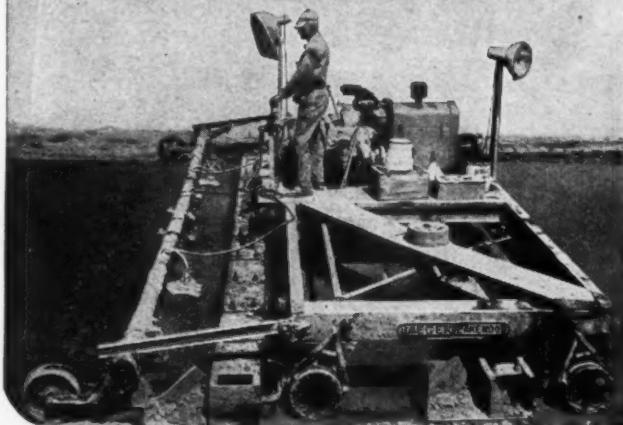
JAEGER DISTRIBUTORS in over 100 cities sell, rent and service "Sure Prime" Pumps.



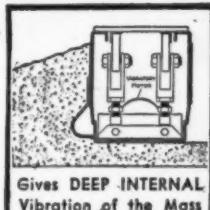
LOOK AHEAD

WHEN YOU PLAN

Jaeger's method of **VIBRATION ON THE FINISHER** will meet tomorrow's specifications . . .



Either Vibratory Tube or "Bullnose" Vibratory Screeed



Gives DEEP INTERNAL VIBRATION of the Mass

"Bullnose" front screed, equipped with vibratory motors, crowds material under, insures deep internal vibration of entire mass and maximum density of slab from form to form — the original and unfailingly successful Jaeger method. Compare this with mere surface vibration which, tests show, does not efficiently overcome porosity at base and sides.

Although Jaeger can furnish a vibratory attachment for use on Concrete Spreaders if desired, the recommended Jaeger method of vibration on the Finisher has proved superior for any true vibratory mix. On an efficiently run job, only the Finisher has time to go back for more than one vibratory pass, as often needed. Also, it is the machine which always finishes to form level, thus insuring an over-all vibrated surface. (No low spots to be filled with unvibrated material or high spots from which the vibrated surface may be torn as is possible when vibration is on the Spreader.)

To meet future specifications we recommend the Jaeger Vibratory Finisher with "bullnose" screed giving DEEP INTERNAL VIBRATION and maximum density from form to form, or, where conditions are suitable, the use of a Vibratory Tube on the Finisher.

THE JAEGER MACHINE COMPANY

223 Dublin Avenue, Columbus 16, Ohio

JAEGER

Engineered EQUIPMENT

JAEGER-LAKWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

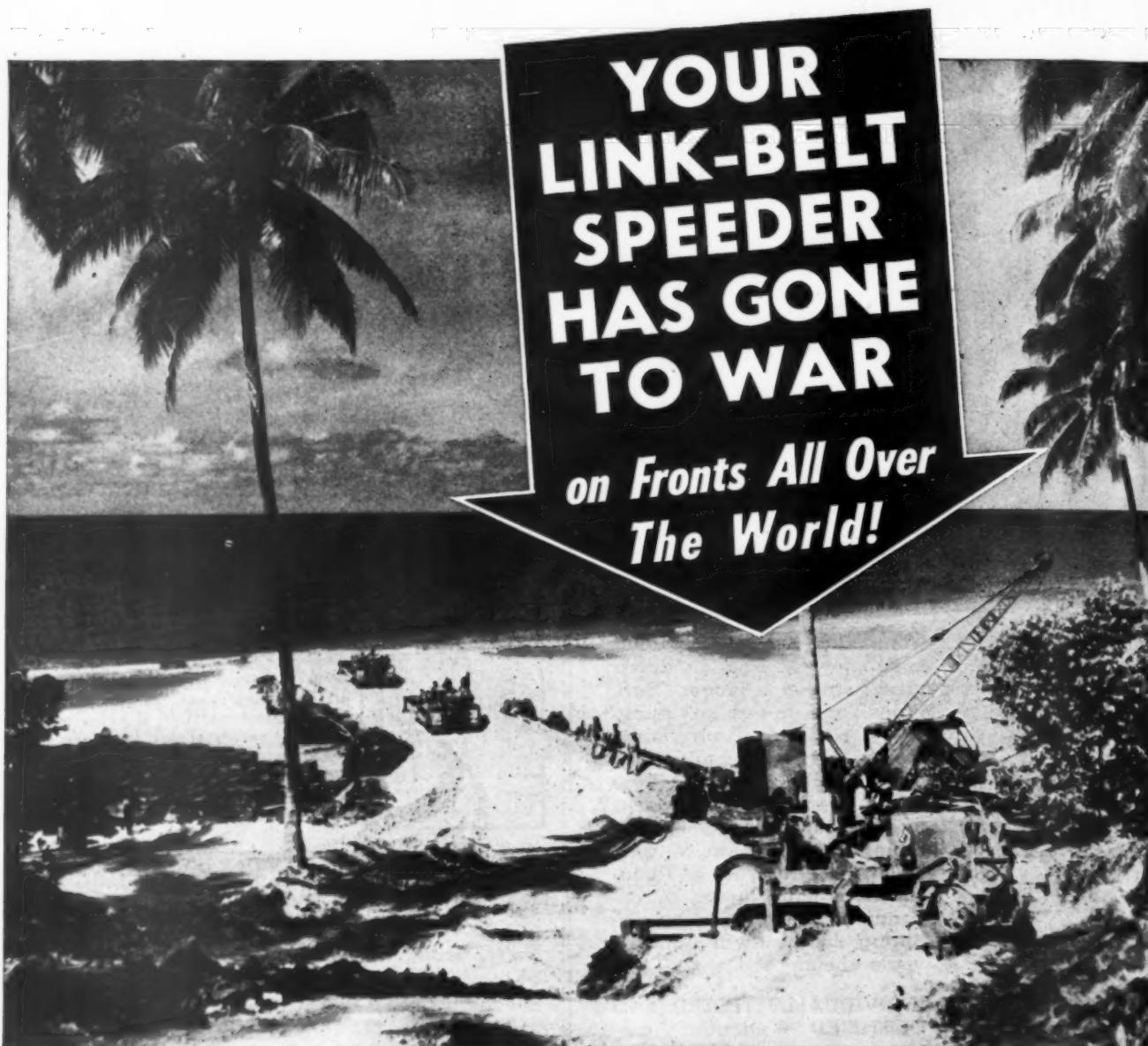


"FLEET-FOOT" CRANE-LOADERS

"SPEEDLINE" MIXERS

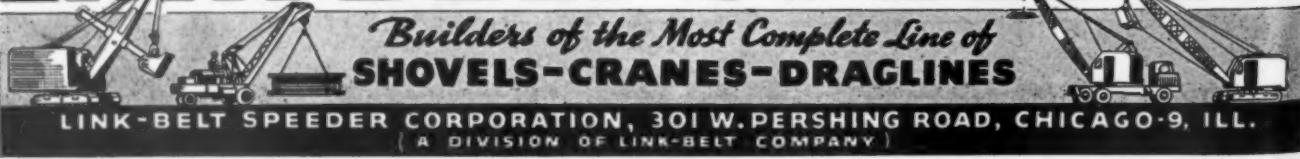
"SURE-PRIME" PUMPS

"AIR-PLUS" COMPRESSORS



- These easy-to-handle, rugged machines can be found on battle fronts all over the globe. Construction battalions everywhere are using them to build landing strips, lay road beds and perform the dozens of other tasks that must be done in order to secure captured territories for further attack on the enemy!

LINK-BELT SPEEDER



Yes...you get compressed air anywhere with SCHRAMM

Far out on a pier construction job in the ocean . . . you find this Schramm Air Compressor.

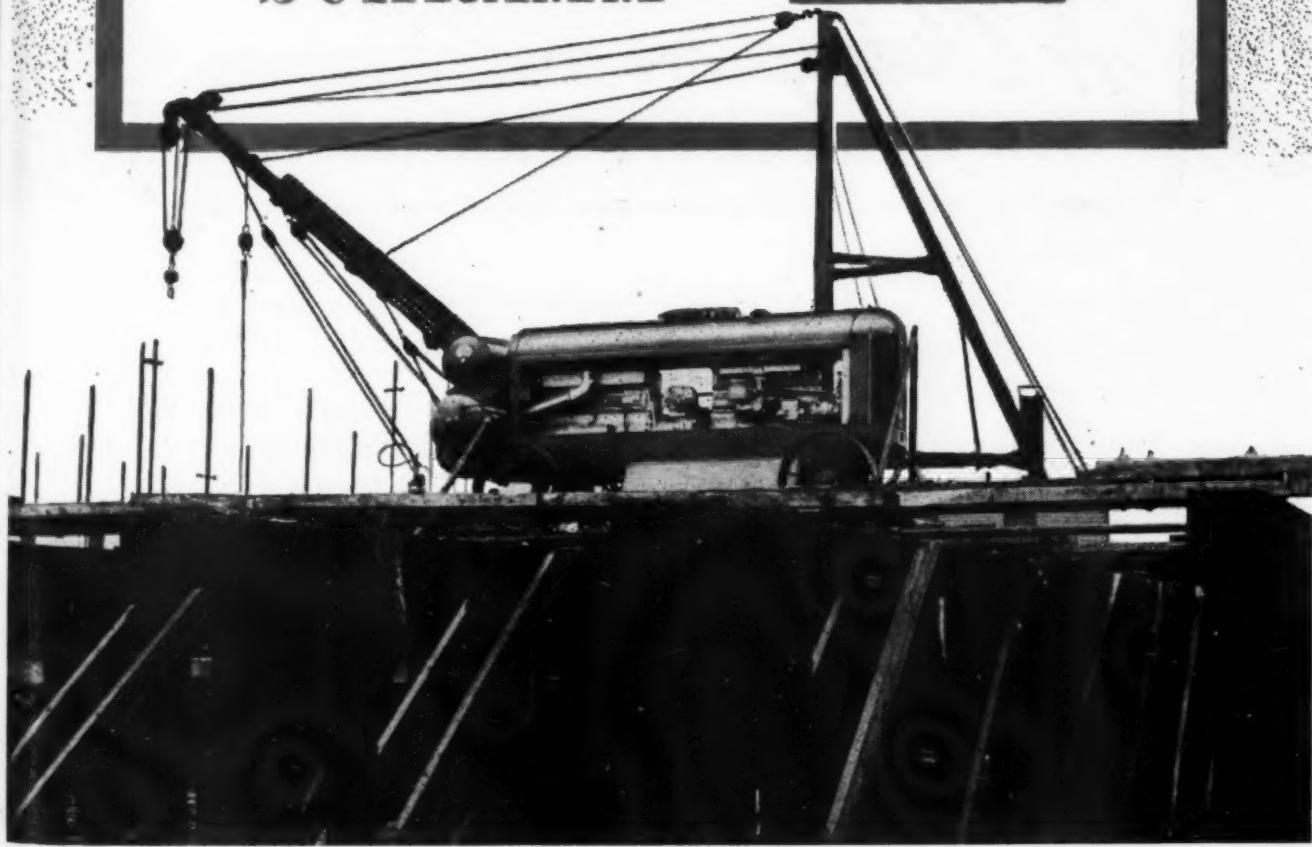
That's the beauty of a Schramm. You're able to take the portable unit anywhere—because they are lightweight, compact, easy to tow about.

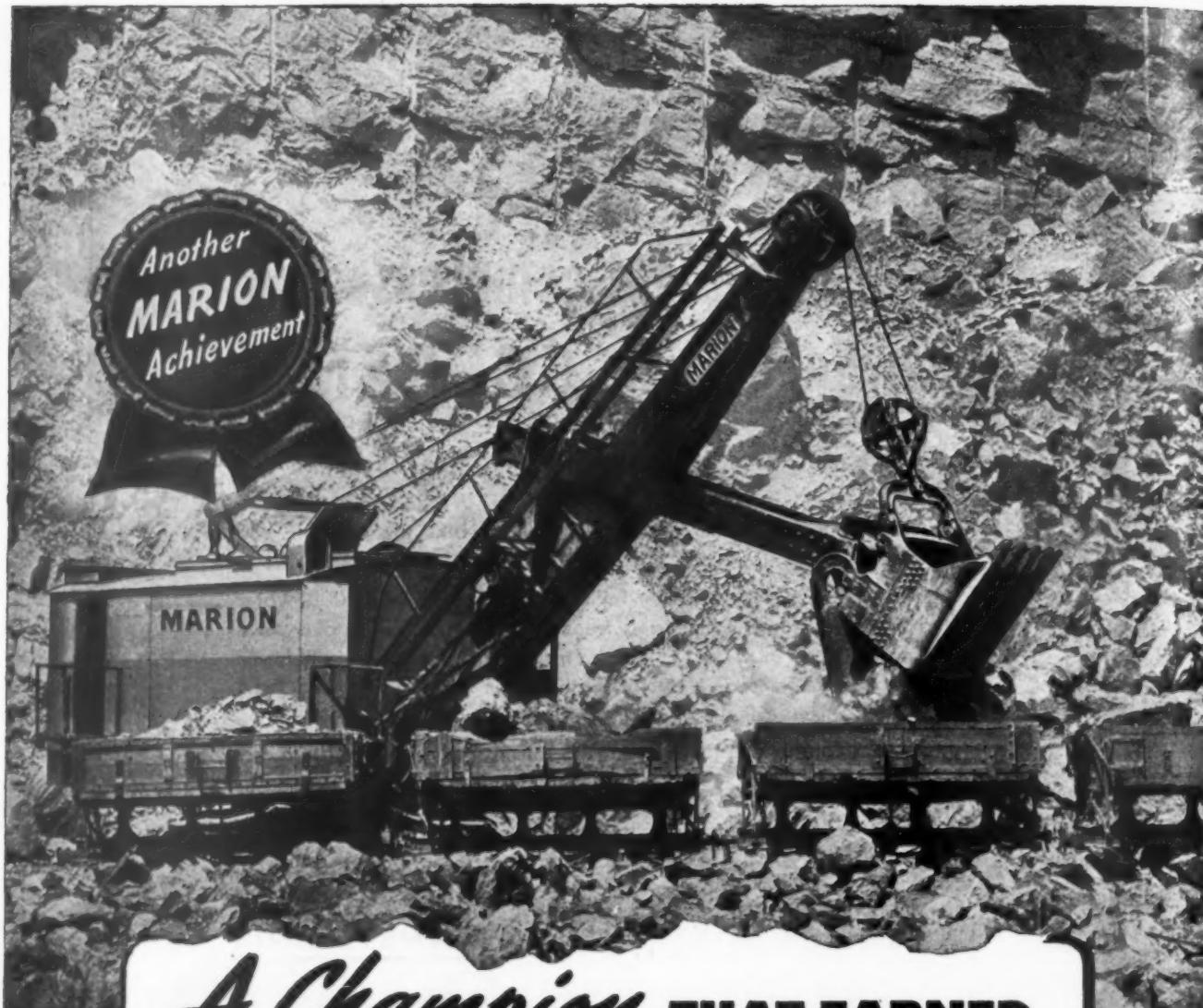
You get all the air you want. Never-failing service results from: 100% water cooled to prevent overheating and freezing . . . mechanical intake valve operating from cam in perfect timing . . . larger discharge valve with lower lift adding to efficiency . . . electric push button starter . . . forced feed lubrication . . . multi-cylinders and lighter parts.

Simplify your construction job by using Schramm Compressors. Write today for Bulletin SE-44.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA





A Champion **THAT EARNED
ITS TITLE THE "HARD WAY"**

This MARION 3 cu. yd., 492 shovel was designed to give that "extra something" needed for heavy digging.

Their performance in rock and

ore stamps them as record-breaking champions.

What are your material handling problems? Let's discuss them.

THE MARION STEAM SHOVEL COMPANY • MARION, OHIO

Modernize with

MARION

SHOVELS • DRAGLINES • CRANES • CLAMSHELLS • WALKERS • PULL-SHOVELS
COAL LOADERS • STRIPPING SHOVELS • GAS • DIESEL • ELECTRIC (From $\frac{3}{4}$ cu. yds. to 35 cu. yds.)

Swords into plowshares . . .



Pillboxes into Pavements



War's most formidable fortification lines are built of concrete *reinforced*, of course, with *steel*. Soon, we hope, this combination of materials which best resists destruction by force will again be available for the more constructive uses of peace.

Many thousands of miles of modern concrete highways are planned and will be needed for the better post-war America. Existing highways, after 3 years of inadequate maintenance under peak traffic loads, have proved beyond doubt the superiority

of *steel reinforced* concrete pavement. The conclusion is inescapable that permanent highways of tomorrow should be so constructed.

Pittsburgh Welded Wire Reinforcement provides all the advantages of added strength, resistance to shock, crack control and longer life. Plan now for the highways of tomorrow and include Pittsburgh Reinforcement in those plans. Full technical facts and engineering cooperation are yours for the asking. Write



PITTSBURGH STEEL COMPANY

1661 Grant Building . . . Pittsburgh, Pa.

Pittsburgh Welded Reinforcement

YOU WOULDN'T





**PUT A STRAIT JACKET
ON AN *Acrobat***

LAY-SET PREFORMED is green.

Of course, this analogy is far-fetched. Any aerial acrobat dressed in a strait jacket would probably break his neck. But it is still true that the wires and strands of non-preformed wire rope are virtually in a strait jacket—locked in position and under constant stress—with the result that the rope doesn't perform as well nor so long as Hazard LAY-SET, which is preformed at the mill and entirely relieved of stresses and strains. LAY-SET Preformed wire rope gives you greater dollar value because it requires no seizing when cut; it resists kinking and whipping; it is easier to splice, faster to reeve and safer to handle. Since it is endowed with high fatigue resistance, it wears longer.

Hazard LAY-SET Preformed Wire Rope is "in the service" on countless jobs for the Armed Forces where it is proving its many advantages. Specify it for *your* use.

HAZARD WIRE ROPE DIVISION • Wilkes-Barre, Pa., Atlanta, Chicago, Denver,
Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma
AMERICAN CHAIN & CABLE COMPANY, INC. • BRIDGEPORT • CONN.



HAZARD LAY-SET WIRE ROPE

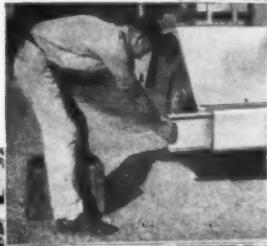
STABILITY FOR HEAVY LIFTS



Truck-like mobility has been an important feature of MICHIGAN convertible cranes and shovels, both in civilian and military use. But STABILITY is an equally important factor. Balanced design provides low center of gravity and low unit ground pressures for working on soft or muddy areas.

Optional outriggers give added stability for extra heavy lifts—contributing further to the broad working range of the MICHIGAN. Write for New Bulletin RS-104.

Rugged I-beam Outriggers (optional) slide out for instant use. Obtainable for center, for rear, or for both positions.



MICHIGAN

POWER SHOVEL CO.

BENTON HARBOR, MICHIGAN

YOU CAN DEPEND ON LA PLANT-CHOATE

"Know-How"

FOR THE BEST IN TRACTOR EQUIPMENT

When it comes to developing new and better tools for your post-war jobs remember—no other manufacturer in the tractor equipment field can match LaPlant-Choate's 33 years of pioneering leadership. This record is your best assurance of tomorrow's best buys in tractor equipment.

LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia.

- 1911—LaPlant-Choate started out as a partnership between E. W. LaPlant and Roy Choate—manufacturing horse-drawn stump pullers and house moving equipment.
- 1919—Introduced a line of trailers with solid disc steel wheels for hauling logs, heavy machinery, etc.
- 1922—Began manufacturing steel dump wagons with disc steel wheels for hauling dirt behind tractors.
- 1923—Developed the first tractor-mounted bulldozers to be manufactured on a commercial scale. Original models were hand operated and mounted on Holt and Best tractors, which preceeded "Caterpillar".
- 1924—Introduced a small two-wheeled hydraulic operated carrying scraper with disc steel wheels for operation in tandem behind tractors.
- 1925—Developed the first hydraulic operated bulldozers to be produced on a production basis. Also the first tractor-mounted snow plow with both the "V" and wings hydraulically controlled. Became the first company to build earthmoving and snow removal equipment for use exclusively with "Caterpillar" tractors.
- 1927—Business incorporated April 5, 1927. Introduced a dozer with an angling blade for side casting material.
- 1929—Introduced a dozer with a tilting blade. Also developed a small hydraulic operated roll-over scraper (Fresno type).
- 1934—Originated the first front mounted hydraulic pump for use with "Caterpillar" tractors in operating dozers, scrapers and snow plows.
- 1935-37—Pioneered the first hydraulic operated brushcutters, treedozers, rootcutters and weed eradicators for clearing waste land. Also began manufacturing two-wheeled hydraulic operated scrapers on rubber tires. Introduced the first positive forced ejection hydraulic scraper ever built.
- 1938—Developed the first successful cable operated carrying scraper to utilize the principle of simultaneous operation of gate and apron in loading and unloading. Also introduced a line of cable operated dozers, rippers and sheepfoot tamping rollers.
- 1940—Pioneered the first scraper to dig, carry, dump and spread by means of single valve and jack arrangement. Also developed the first practical inside frame dozer.
- 1941—Introduced the first hydraulic operated scrapers for use with "Caterpillar" high speed rubber tired tractors.
- 1942—Originated the first airborne bulldozers and scrapers to be flown in Army transport planes.
- 1943-44—Became the nation's largest producer of dozers for the armed forces; pioneered first Beach-Dozer and first Tank-Dozer, in cooperation with U. S. Army Engineers and Ordnance.

NOTE: LaPlant-Choate now controls over 120 patents and applications covering both hydraulic and cable operated tractor equipment.



LA PLANT-CHOATE
Earthmoving and Land Clearing Equipment



Using a "99-M", with finisher and loader attachments, to clear a path for a railway through the heart of the Brazilian jungle.



As the work progresses, the blade plows a windrow of dirt for the loader attachment to pick up and load into trucks.



TOUGH JOB CHAMP

Take any job on which there are motor graders of various types . . . a job on which there is real pioneering to be done . . . in rocks, sand or mud . . . or on steep slopes. Which machine do you find up front where the going is roughest and toughest? The Austin-Western 99-M Power Grader.

IT HAPPENS EVERY TIME . . . and there's a good reason. No other motor grader can match the all-around, rough-and-tumble performance made possible by the 99-M's exclusive All-Wheel Drive and All-Wheel Steer.

Your nearby A-W Distributor will be glad to tell you the whole story.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

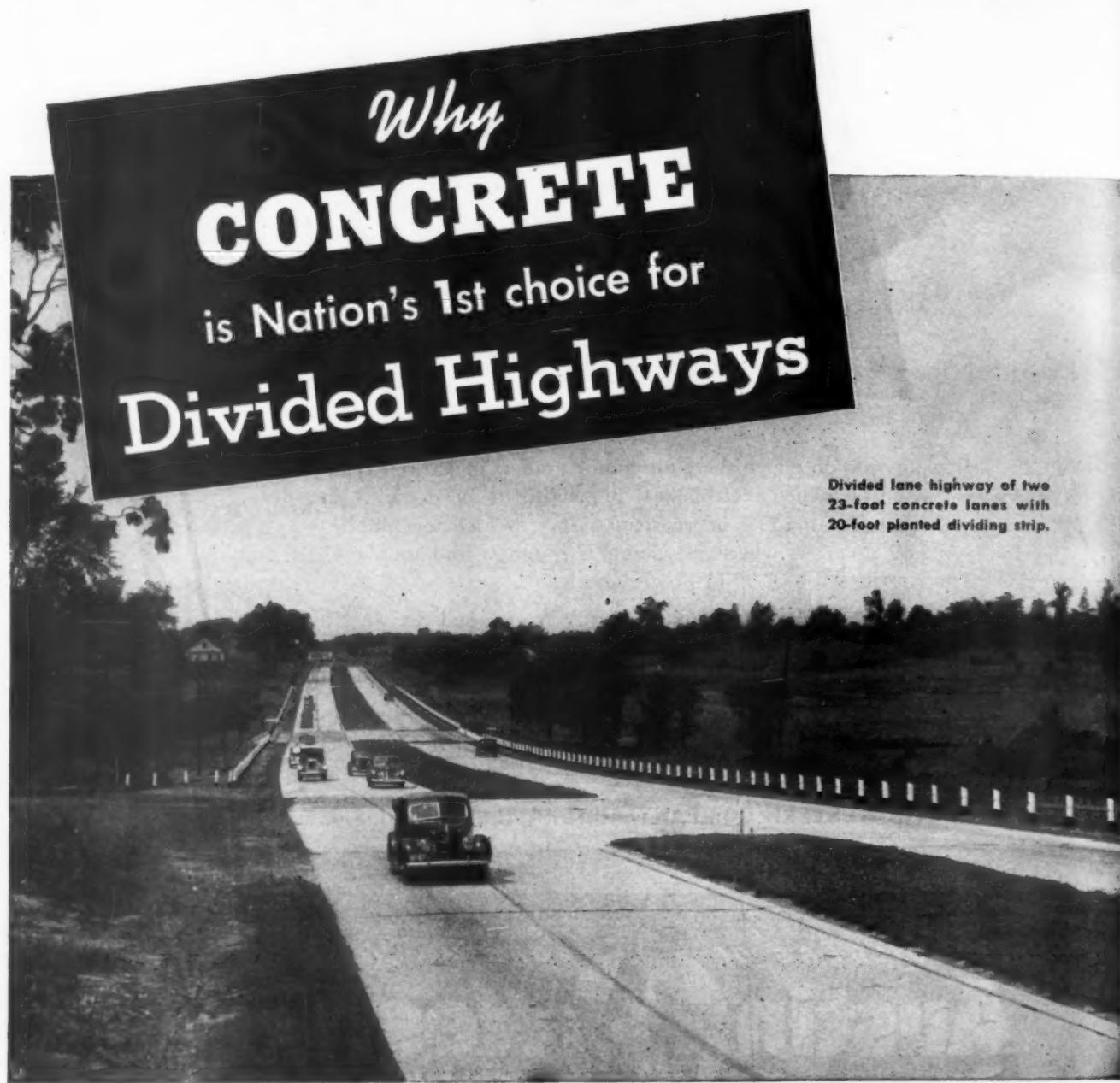
BUILDERS OF ROAD MACHINERY
Austin  **Western** SINCE 1859

BUY MORE
WAR BONDS

Building a road through blow-sand, where the ordinary motor grader cannot travel with
blade empty, let alone work.

All-Wheel Drive and All-Wheel Steer are responsible for this beautiful job of sloping a steep bank of wind-blown soil.





Divided lane highway of two 23-foot concrete lanes with 20-foot planted dividing strip.

Significantly, concrete is the overwhelming choice for the rapidly-growing mileage of divided pavements . . .

because concrete is inherently *safe*. It is skid-resistant, wet or dry; affords high visibility at night.

because concrete is *economical*. Concrete almost invariably costs *less to build* than other pavements of equal load capacity. It has a long life; costs *much less* to maintain and affords low vehicle operating costs.

because concrete is *satisfying* to drive on. Its smooth-riding, even surface improves car control; reduces nervous strain; expedites orderly traffic flow.

PORLAND CEMENT ASSOCIATION
Dept. 10-28, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

AMERICA IS *Built with Aggregate!*

Guardian of City Health

Safeguarding the health of cities is one important job huge sewage disposal plants perform so ably. Contagious diseases which formerly ravaged the country have been practically stamped out by the effective treatment of sewage.

Large quantities of aggregates are used in the construction of filters, settling tanks, and buildings, in addition to the four or five-foot thick layer of special crushed stone for the trickling filters.

Whether you are producing aggregate for municipal plants, bridges, highways, stadium or airport, you'll get better results and it will cost you less if you use Cedarapids aggregate producing and crushing equipment.

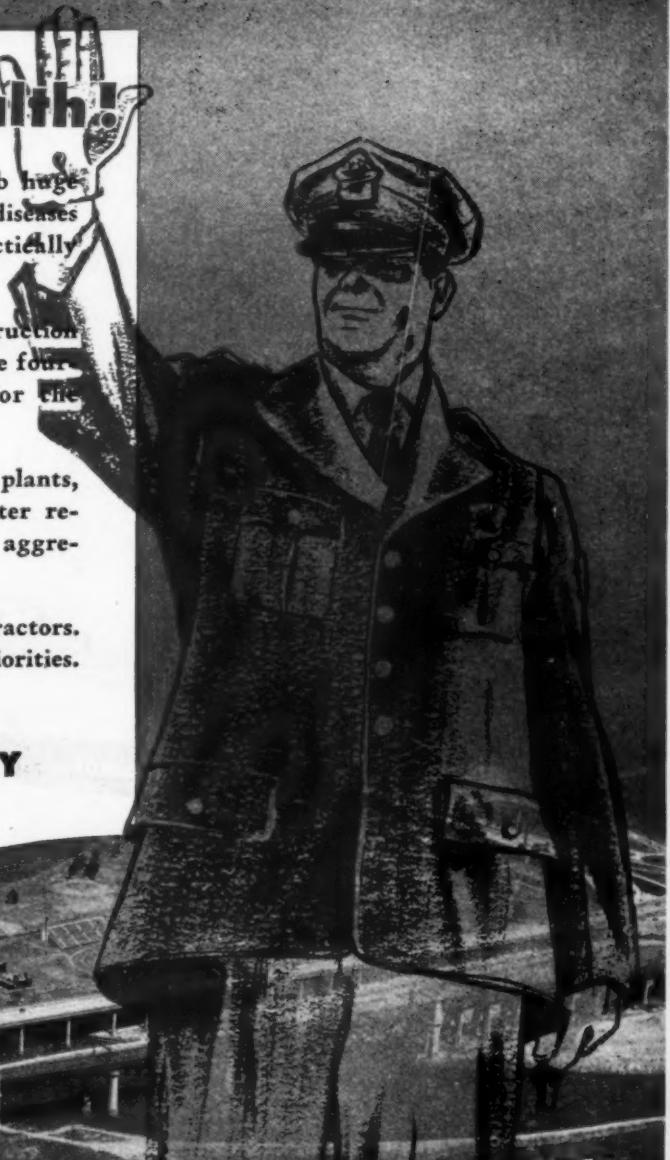
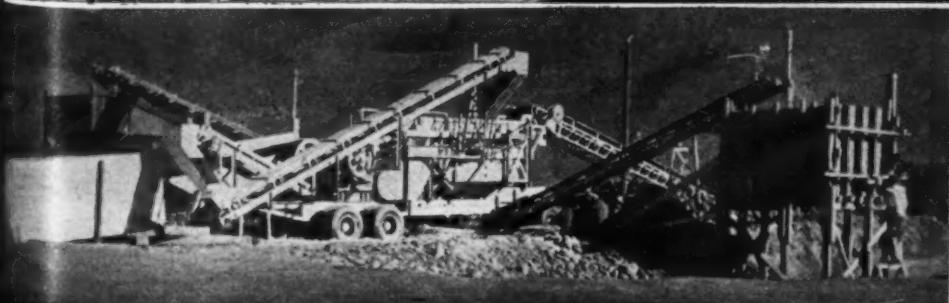
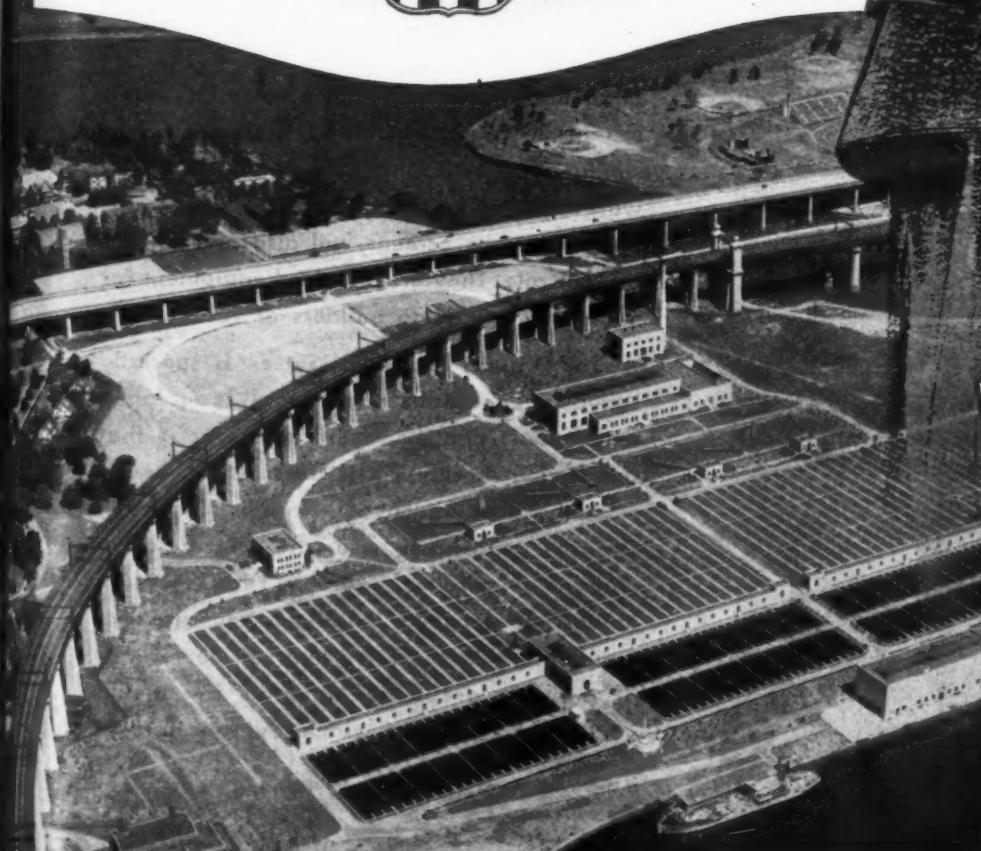
More Cedarapids equipment is now available for contractors. Let us help you secure the necessary releases and priorities.



CEDAR RAPIDS

IND. MFG. COMPANY
CEDAR RAPIDS, IOWA

IOWA MANUFACTURING COMPANY



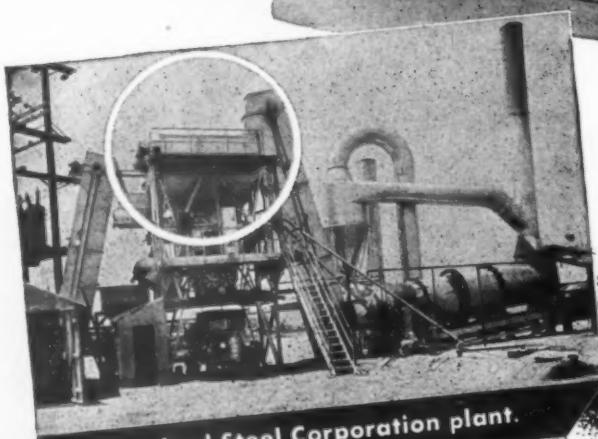
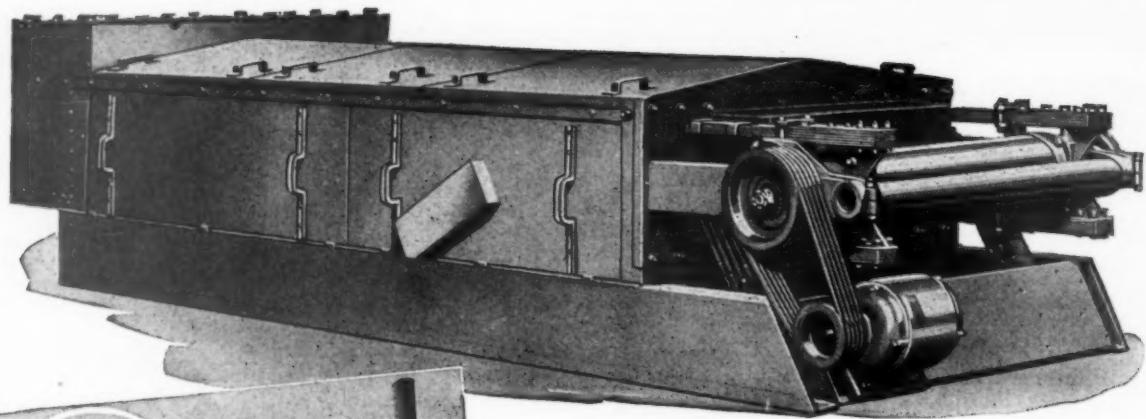
Cedarapids

Built by
IOWA

THE IOWA LINE

of Material Handling Equipment
Includes

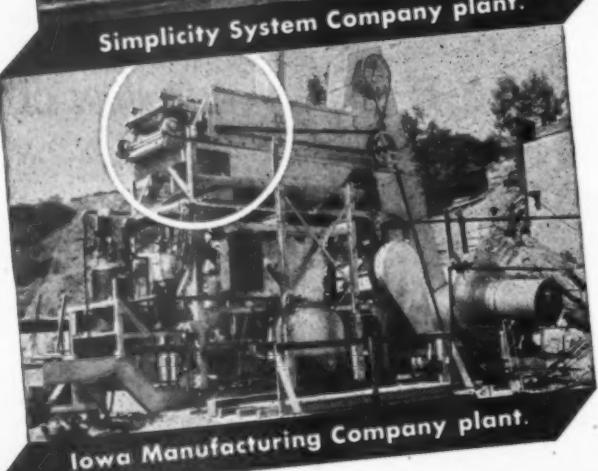
ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING
SCREENS
STRAIGHT LINE ROCK AND
GRAVEL PLANTS
FEEDERS—TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX)
PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS



Standard Steel Corporation plant.



Simplicity System Company plant.



Iowa Manufacturing Company plant.

USED BY LEADING
BUILDERS OF
"BLACK TOP" PLANTS

Bituminous paving will play an ever important role in the building of airfields, highways and similar construction projects planned for post-war. In providing the materials for "black top" plants, Symons Screens will also play an important role. They are standard equipment for many of the leading builders of such plants.

The Symons Horizontal Screen is specially suited for "hot plant" screening. It is equipped with a dust tight enclosure so arranged that the driving mechanism is outside and away from the dust and heat. Since it sets level, accurate grading is assured. A level screen with its minimum headroom reduces plant height and conveyor length. If you are contemplating this "black top" market, be assured of properly prepared materials by having your plant equipped with a Symons Screen.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN

NEW YORK • LOS ANGELES • LONDON • TORONTO



SYMONS SCREENS



MODERN bucket construction is engineered with ample margins of safety, meeting all impact requirements—but you can still improve any bucket's wearing qualities by applications of Stoody Self-Hardening! Hardface only those parts receiving greatest abrasion; it's more economical and it equalizes wear over the entire bucket surface by retarding rapid abrasion on the lips, runners and other points of "spot wear."

NEW BUCKETS are kept in topnotch condition by hardfacing important wearing surfaces before buckets are put in service, thereby preventing wear from reaching original steel. **STRINGER BEADS** of Stoody Self-Hardening are an ideal means of wear protection on new buckets.

WORN BUCKETS are best, 1) built up with Stoody manganese electrodes or, 2) patched with manganese or high carbon steel plate. Patches should be entirely surfaced with Stoody Self-Hardening to prevent abrasion on softer steel beneath.

Stoody Self-Hardening, an alloy of high chromium-manganese, is ideal for protecting earth working equipment. It's easy to apply, bonds well with manganese steels, has exceptionally high wear resistance without the disadvantage of chipping and is economical—3/16" and 1/4" diameter rods are priced at only \$.50 per lb., f.o.b. Whittier, Calif., or distributors' warehouses.

Last, but not least, you can get Stoody Self-Hardening almost anywhere—over 600 dealers in principal U. S. cities are at your service.

STOODY COMPANY
1125 WEST SLAUSON AVENUE, WHITTIER, CALIFORNIA

STOODY HARD-FACING ALLOYS
Retard wear... Save Repair

SERVING THE Petroleum Needs of the Nation



Typical Sinclair Refinery, Transportation and Distribution Units.

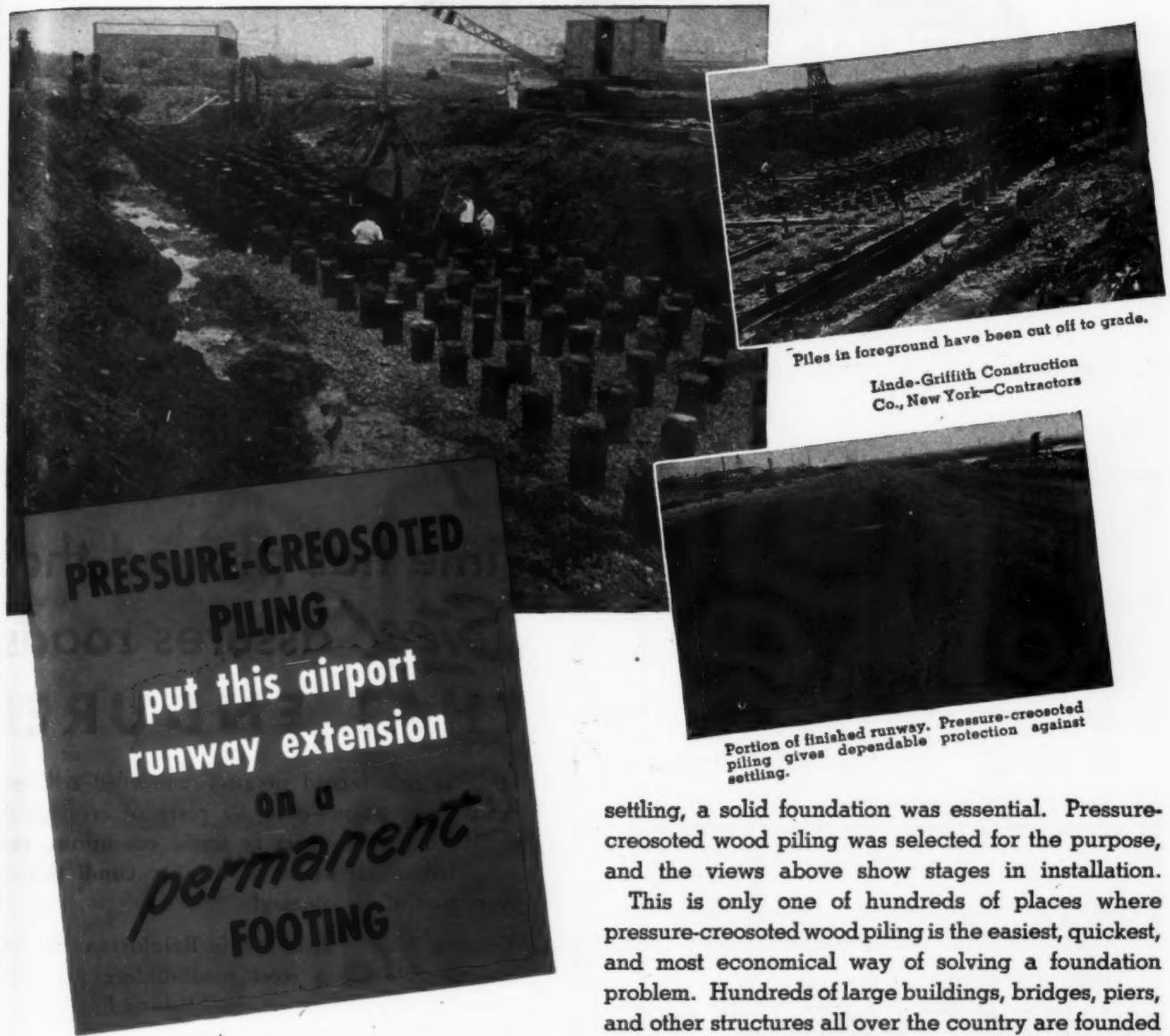
- SINCLAIR produces oil from more than 8000 wells located in the United States and Venezuela.
- MANUFACTURES all types of petroleum products in 10 modern refineries processing 90,000,000 barrels of crude oil annually.
- TRANSPORTS 300,000 barrels of crude oil and finished products daily through 14,000 miles of pipe lines; also employs thousands of tank cars and a large fleet of ocean tank ships.
- OPERATES a chain of waterfront terminals from the Gulf of Mexico to New England.
- DISTRIBUTES petroleum products through 2000 wholesale bulk plants which also service a network of many thousands of Sinclair Dealer stations.
- PRODUCES basic material for manufacture of synthetic rubber in one of the largest butadiene plants in the United States.

Sinclair is America's outstanding manufacturer of lubricants.

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N.Y.

ROADS AND STREETS, October, 1944



**PRESSURE-CREOSOTED
PILEING**
put this airport
runway extension
on a
permanent
FOOTING

Here's an idea you'll find profitable, for with all the post-war construction that is predicted, you may run into a similar situation.

When the runways were extended at a large Eastern airport, the U. S. Engineers found that it would be necessary to construct culverts to divert streams of water at several places. The runway had to withstand heavy impact during plane landings, and in order to provide necessary strength and avoid

settling, a solid foundation was essential. Pressure-creosoted wood piling was selected for the purpose, and the views above show stages in installation.

This is only one of hundreds of places where pressure-creosoted wood piling is the easiest, quickest, and most economical way of solving a foundation problem. Hundreds of large buildings, bridges, piers, and other structures all over the country are founded on them. Because of the demonstrated dependability of pressure-treatment, cut-offs above the water table can be safely made. In salt water installations, experienced engineers regard pressure-creosote treatment as the most effective protection against marine organisms.

A four-page folder, "Pressure-Creosoted Piling for Permanent Foundations," lists some of the many places where pressure-creosoted piling is serving. May we send you a copy?

KOPPERS COMPANY • WOOD PRESERVING DIVISION
PITTSBURGH (19) PA.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY



LOOK AT ROAD PERMANENCE
WITH THIS VIEWPOINT



Time has proved that
Steel assures roads
THAT ENDURE!

Look at this record of steel-reinforced concrete road construction—over 30 years of economical service under all types of traffic conditions, and subjected to all kinds of weather conditions in every part of the country!

Truscon Welded Steel Fabric Reinforcement, and associated Truscon steel roadbuilding products, have played a big part in establishing this impressive record for concrete highways.

What the cord fabric is to the modern automobile tire, Truscon Welded Steel Fabric is to the modern highway that carries it. Both provide reinforcing... both add immeasurable strength and extra service to a strong basic material. You can be *sure* that Truscon Welded Steel Fabric Reinforcement, and associated Truscon Steel roadbuilding products, will build better roads for the communities you serve, and greater prestige for you.

ARMY
E
NAVY
TRUSCON
Steel Company
YOUNGSTOWN 1, OHIO

SUBSIDIARY OF REPUBLIC STEEL CORPORATION



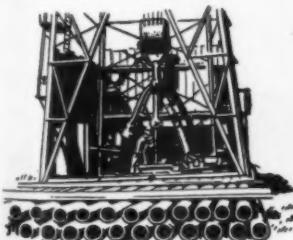
For the new dump trucks, shovels, compressors, locomotives, or the various other heavy-duty construction and material handling equipment you are planning to buy, specify Cummins Diesel power. Practically all of the leading manufacturers offer this diesel as optional equipment.



In the Northwest Woods, Cummins Diesels do the complete job—from saw to siding. They power yarders, loaders and tugs . . . trucks that handle up to 240,000 pounds (three carloads). In this service, Cummins Diesels are the symbol for "cheap logs."



In the commercial fishing fleets of the Pacific, Atlantic and Gulf coasts, and in all types of work boats and pleasure craft, Cummins Marine Diesels—propulsion engines and generating sets alike—have become a byword for dependable, low-cost performance.



In the vast Mid-Continent area, the world's greatest oil producing territory, Cummins Dependable Diesels power more rotary and cable tool drilling rigs and oil well service units than any other make of diesel engine.

Step by Step

Tremendous weight and size greatly limited the uses of early-day diesels. Twenty-six years ago, the builders of Cummins Diesels decided to do something about that—and did! Step by step, and with each step first tested and proved on the job, they simplified design . . . improved construction processes . . . turned to lighter, stronger materials . . . steadily boosted the rpm. That, briefly, is the story of the modern Cummins Diesel . . . the original high speed diesel that, since 1932, has won its spurs on the toughest, heavy-duty jobs . . . in virtually all types of heavy-duty equipment, automotive, industrial, marine. For tomorrow, continued refinements in diesel manufacture promise a Cummins Dependable Diesel that will do your job still cheaper, still faster, still longer. So plan now to standardize on Cummins Diesel power for the equipment you will build or operate after the war. **CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.**





the problem of SLUDGE

IT IS well known among automotive engineers that engine deposits (sludge) cause stoppage of oil circulation, sticky rings, oil pump trouble and other serious damage resulting in overhaul time and expense.

Sludge either stays in suspension in the oil and causes the lubricant to become black, or it sticks to the motor parts and does its dirty work of destruction.

LOW AND HIGH TEMPERATURE SLUDGE

There are two general types of sludge—that caused by low temperature operations and that by high.

Low temperature sludge is usually a semi-solid material with the consistency of soft mud. It is composed of oil mixed with water and fine particles of carbon, metal, dirt, dust or fuel gums.

*Free Folder on Sludge—Its Causes and Cures
Write today for your copy • Address: Macmillan Petroleum Corp.,
530 W. Sixth Street, Los Angeles 14, Calif.*

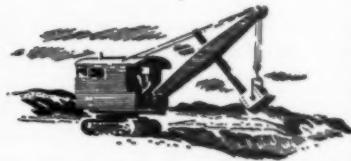
"Stop and Go" operation with prolonged idling of the motor is a common cause of low temperature sludge. A leak in the water system surrounding the cylinders may also be responsible. Low temperature sludge clogs the oil lines and screens, resulting in burned out bearings and scuffed cylinder walls.

The principal difference between high temperature sludge and low is that the former contains large amounts of resins resulting from the oxidation of the oil in the crankcase. This type of sludge is comparatively free from water and soot.

High temperature sludge produces two different kinds of deposits in the engine. The granular or "coffee ground" sludge in the crankcase or oil pan and on the surface of the pump screen is well-known to mechanics. Varnish, gummy or lacquer-

like deposits that form on piston and ring faces and cylinder walls, because of high temperature oxidation of thin oil films, is another kind.

High temperature sludge is caused from prolonged high speed and engine operation, overloading the engine, clogged radiator or cooling system.



HOW TO REMEDY SLUDGE SITUATION

Low temperature sludge can be easily recognized by simply heating some of the deposit on a piece of metal over a flame. If the material foams or sputters and crackles, then water is present. To remedy this, check for internal water leaks and raise the temperature of the cooling water to 160° to 180° and keep it there by means of radiator shutters or thermostats.

To remedy high temperature sludge, inspect radiators and water jackets and see that they are clean and free of mud and scale. Drain and flush crankcase frequently, especially in heavy duty service. Oxidation of the crankcase oil can be minimized by the use of oil coolers in heavy duty truck service. Keep the crankcase oil temperature below 200° F.

To prevent either type of sludge, keep the lubricating oil clean. Filtering is not enough. Frequent draining and flushing of the crankcase is essential. Drain oil while hot. Base drain periods on a type-of-use basis, rather than time or mileage interval. Keep both air and oil filters free from dust and other foreign matter.

MACMILLAN RING-FREE OIL HELPS REDUCE SLUDGE — One of your most effective sludge remedies is a good lubricating oil. Macmillan Ring-Free Motor Oil (for either Diesel or gasoline fuels) is so refined that it removes the carbon and sludge from the working parts of the engine. It cleanses as it lubricates. The deposits are kept in the oil in suspension and are drained off when you change oil. That's why Ring-Free is black when it's drained.

You'll be surer of
fewer motor
troubles with
Ring-Free Oil.



**MACMILLAN
RING-FREE
MOTOR OIL**

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION—50 WEST 50TH STREET, NEW YORK 20 • 624 SOUTH MICHIGAN AVENUE,
CHICAGO 5 • 530 WEST SIXTH STREET, LOS ANGELES 14 • COPYRIGHT 1944, MACMILLAN PETROLEUM CORPORATION

Resurfacing



Asphalt resurfacing of our highways, streets and roads, now greatly in need of attention, offers many advantages. Dangerously cracked and broken pavement is restored to a safe surface. Practically no engineering time is required. Operations can be started immediately and completed within a short time.

Savings are effected through utilizing the old base, eliminating the cost of new construction. Leveling arms smooth out uneven base surfaces.

Using the Barber-Greene Tamping-Leveling Finisher, only a minimum operating crew is required.

There is little traffic interruption as the Barber-Greene lays one ten to twelve foot lane at a time. Because of the tamping action, material is compacted immediately behind the machine so that rolling can progress right up to the Finisher.

For further information on the B-G Finisher and its availability now, write Barber-Greene Co., Aurora, Illinois, U. S. A.

44-7

BARBER - GREENE
AURORA, ILL.

TALK ABOUT CONVERSION-

Read These Facts!

Before—

Beu & Sons, Sumner, Iowa, "190-G" Universal crushing, screening and loading plant with 10" x 36" jaw crusher, is shown producing aggregates near Pine Lake State Park, Hardin County, Iowa. Output averaged 1,500 yards per 10½ hour day from an unusually deep pit and ran as high as 2,200 yards in a 12½ hour day.

This progressive contractor recently took a contract for agricultural limestone in northern Iowa.

After—

The jaw crusher on the "190-G" was readily replaced by a Universal No. 4 hammermill and a Universal primary unit consisting of a 20" x 36" roller bearing jaw crusher with apron feeder was added providing a "tailor made" plant capable of handling the new contract. The revamped plant is shown operating near Ackley, Iowa. As much as 125 tons of aglime per hour have been turned out, averaging better than 100 tons per hour.

This is another case where standard Universal units were economically used to readily convert a plant. There is no end to the variety of combinations that are possible using standard Universal "packaged units."

Handle aggregates today, riprap tomorrow, ballast next month.

Universal engineers and field men have the answers to your conversion problems.



UNIVERSAL ENGINEERING CORP.
631 C Avenue, West Cedar Rapids, Iowa

UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS





At the control panel, this project engineer is studying the results of a test on one of the many Wellman dynamometers.

Solving your problems of RUBBING SURFACES

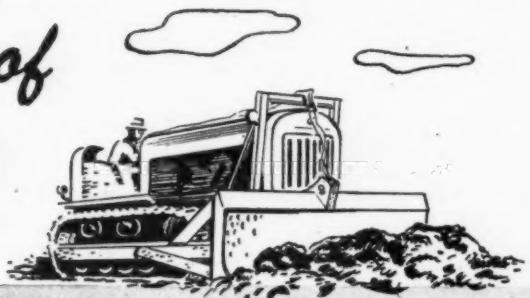
FRICITION is developed when two surfaces are rubbed together. Friction lights a match . . . and it's friction that operates your clutches and brakes. In the great S. K. Wellman laboratories we are engaged in continuous study of powder metallurgy, to improve friction qualities of Velvetouch *all-metal* clutch facings and brake linings . . . to bring you dependable friction materials *engineered to your exact specifications*.

Specify Velvetouch replacement clutch facings and brake linings for your tractors, graders, scrapers, shovels and other earthmoving equipment.

THE S. K. WELLMAN COMPANY
1374 EAST 51st STREET • CLEVELAND 3, OHIO

For Brake and Clutch . . . Use

Velvetouch

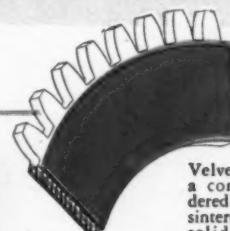


Interesting Facts About FRICTION

If two rubbing surfaces are separated by a film of oil, the friction is almost independent of the nature of the surfaces.



As shown in the illustration, a 10 lb. block sliding on a non-lubricated surface, requiring 2 lbs. of force, has a .2 coefficient of friction. When the surface is lubricated, however, the force required is only 1 lb. and the coefficient of friction drops correspondingly to .1. As lubrication decreases, the coefficient of friction becomes more dependent upon the material of the surfaces.



Velvetouch is *all metal*—a combination of powdered metals, compressed, sintered and welded to a solid steel backing plate.

RESULTS *that count*

IN UNCLE SAM'S ROAD-BUILDING PROGRAM

Results tell the story of **SKF** Bearings on the connecting rods which drive oscillating front and rear screeds of this Lakewood Type "H" Finisher. Results in the form of velvet smoothness free from jerk or weaving as the screeds buck and break down piles of dry, stiff concrete deposited from the power bucket . . . spread and finish off the material. Results in the form of 250 linear feet per hour of 9"-6"-9" cross section day after day as this finisher follows a Jaeger screw concrete spreader on 25' wide airport slab. Results in the form of freedom from bearing trouble as **SKF**-equipped machines hasten Uncle Sam's construction program.

5446

SKF INDUSTRIES, INC., PHILADELPHIA 34, PA.



SKF-EQUIPPED
Finisher

Built by Jaeger Machine Co. has four speeds forward and four reverse.

Digging An Axis Grave

AM

An American Bullgrader digging, literally, an Axis grave is symbolic of the job's dirt-moving equipment has done to speed complete Victory. On every front, the work of bulldozers, Dozershovels, scrapers, etc., hastens the final funeral of the frenzied fanatics.

On every front, too, Bucyrus-Erie tractor equipment like the Bullgrader above is in the thick of it. Outstanding as always, now it is helping prepare the Axis burial.

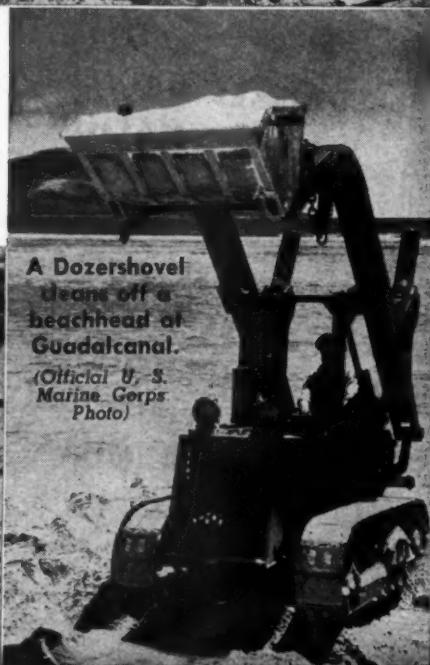
N-71C



A Bullgrader digs a burial place for dead Japanese.

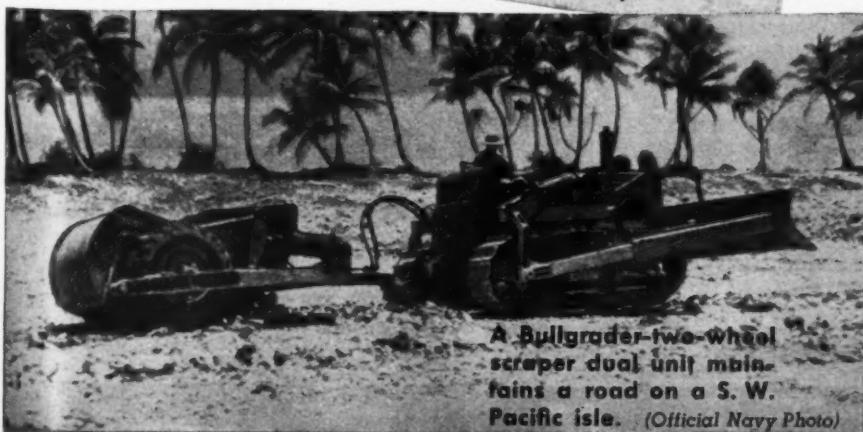


A Bullgrader begins preparing a road at Tarawa.
(Official U. S. Marine Corps Photo)



A Dozershovel clears off a beachhead at Guadalcanal.
(Official U. S. Marine Corps Photo)

BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WISCONSIN



A Bullgrader-two-wheel scraper dual unit maintains a road on a S. W. Pacific isle. (Official Navy Photo)

**BUCYRUS
ERIE**
TRACTOR EQUIPMENT

SEE YOUR
INTERNATIONAL TRACTRATOR
DISTRIBUTOR

JOBs WANTED!



for
DIESEL DRIVES
HEAVY MACHINES
DRAGS AND CRANES
PAPER MILLS
RUBBER MILLS
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OIL FIELD DRIVES
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by **HEAVY-DUTY CLUTCH WITH A WAR RECORD**

To help ships maneuver faster than ever before—to help drags and shovels move earth by the million tons—to help heavy machines produce war implements 24 hours a day—those are the jobs on which the Fawick Airflex Clutch has earned its record.

Controlling power by air pressure, without levers or arms or springs, the Fawick Airflex Clutch needs no adjustments, no lubrication. It absorbs shocks and vibration and corrects for misalignment.

If you have a tough clutch or brake problem in any kind of heavy-duty service, write to our Engineering Department for information—they can help YOU.

12 IMPORTANT OPERATING ADVANTAGES

- 1. Simple in design and operation
- 2. Flexible control by air
- 3. No adjustments or oiling—low maintenance
- 4. Dampens vibration—absorbs shocks
- 5. Corrects misalignment automatically
- 6. Smooth starting—no jerks
- 7. Quick stopping
- 8. Runs cooler—uniform pressure
- 9. Controls torque by air pressure
- 10. Greater capacity—more compact
- 11. Replaces couplings
- 12. Remote control by 4-way air valve

FAWICK AIRFLEX COMPANY, INC.
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*In Canada, Renold-Coventry, Ltd., Montreal,
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FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

GOOD
WORKMEN
DESERVE GOOD
TOOLS



BARCO PORTABLE GASOLINE HAMMER

Why pay good wages, then slow down a man's output with inefficient tools? Barco Portable Gasoline Hammers were designed and perfected to enable good men to do more work... with less hardship on the worker. And Barcos have proved they pay a profit on hundreds of different jobs... saving time, speeding the work, keeping workers better satisfied. Rugged yet light and easily portable. Eleven special attachments. For full particulars, write to: The Barco Manufacturing Company, No. 1815 Winnemac Avenue, Chicago 40, Illinois.

BREAKING
DRILLING
DRIVING
TAMPING

In Canada: The Holden Co., Ltd., Montreal

The Free Enterprise System Is The Salvation of American Business

American Welded Wire Fabric

Adds Strength and Stamina to Concrete Roads



HIGHWAYS



AIRPORTS



CONCRETE PIPE



THE billions of square feet which have been used for all forms of concrete construction during the last decade have demonstrated the effectiveness of American Welded Wire Fabric reinforcement.

The high yield-point, cold-drawn steel wires are closely spaced to provide uniform stress distribution. This backbone of steel in the concrete helps to control cracking, reduce spalling and progressive disintegra-

tion. It holds together the faces of small cracks that may form in the slab, providing load transfer across these planes of weaknesses.

On the nation's highway network, under the terrific punishment of wartime traffic, wire fabric reinforcement has proved its ability to insure longer life. Add the extra durability of steel to all of your concrete construction by using American Welded Wire Fabric reinforcement.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York



Columbia Steel Company, San Francisco, Pacific Coast Distributors

United States Steel Export Company, New York

**AMERICAN
WELDED
WIRE FABRIC**

UNITED STATES STEEL

ROADS AND STREETS, October, 1944

TRAXCAVATE!

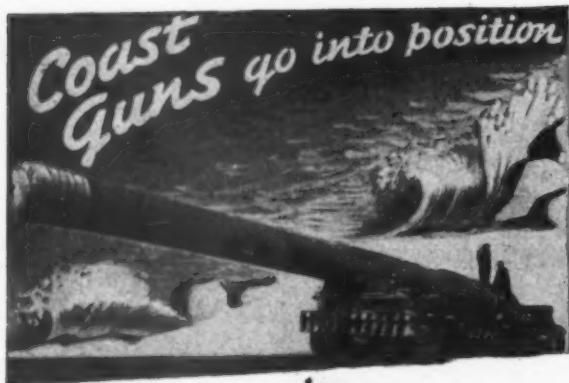
It's the modern earth-moving and material handling method. TRAXCAVATORS, the dependable tractor excavators, combine in one machine, the usefulness of a shovel, loader, scraper, bulldozer, anglegrader, etc. There's a size for every job and purpose. See your Trackson-*"Caterpillar"* dealer or write TRACKSON COMPANY, Milwaukee 1, Wis.



Write for informative literature to
TRACKSON CO.,
Milwaukee 1, Wis.

TRAXCAVATOR

The Original Tractor Excavator.

EXPERIENCE
Builds 'emPERFORMANCE
Sells 'em

"SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!"

ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

on ROGERS TRAILERS

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be even better-engineered and more efficient than the thousands which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
ALBION,
PENNA.



WHEN THE AXIS SURRENDERS
you'll find new and improved
BYERS draglines and shovels
available to go on your job

In the meantime, owners of current and older models of Byers shovels and cranes may depend on Byers Parts Service to help them keep present equipment working steadily and satisfactorily.

For crawler, truck mounted or self-propelled models of shovels and cranes in the portable sizes, see your nearby Byers distributor.

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CRANES
AND
SHOVELS

RAVENNA, OHIO

DISTRIBUTORS THROUGHOUT THE WORLD

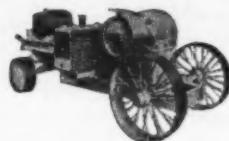
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Serving Industry over 50 Years

**Where the going is tough
Where the Terrain is R-O-U-G-H
Building Bases for the United Nations**

GRUENDLER "ONE REDUCTION" JAW CRUSHERS

GRUENDLER'S ability to speedily crush hard rock, are providing proper size aggregates for the BASES and AIR PORTS of the United Nations.



PORTABLE
JAW CRUSHERS
(U. S. Army Approved)

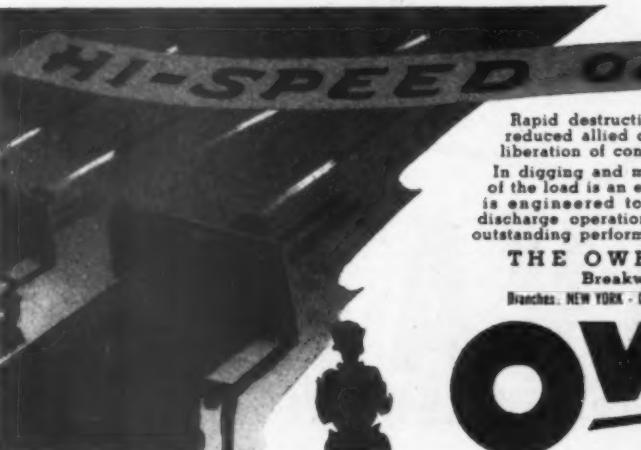
Write us for Bulletins, DATA, and our Engineers' Suggestions on Crushing Equipment. (No obligation)

Mfrs. of Double Roll Crushers and Hammer Crushers for Secondary Crushing requirements.

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2915-17 North Market St., ST. LOUIS (6), MO.



Rapid destruction of enemy fortifications has greatly reduced allied casualties and accounted for the quick liberation of considerable enemy territory.

In digging and material handling too, rapid discharge of the load is an essential feature. Every Owen Bucket is engineered to provide capacity grabs and rapid discharge operation—factors responsible for their outstanding performance.

THE OWEN BUCKET CO.

Breakwater Ave., Cleveland, O.

Branches: NEW YORK - CHICAGO - PHILADELPHIA - BERKELEY, CAL.

OWEN BUCKETS

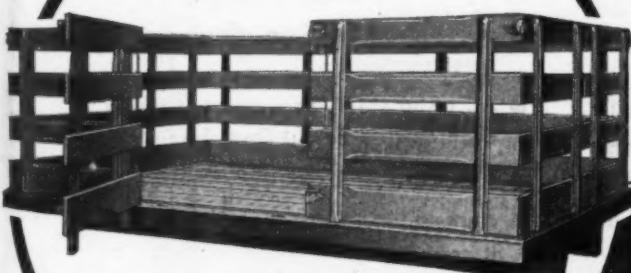


MORE AND MORE
*Extra Value
Extra Service*



This new series of dump bodies has greater rigidity and durability than any previous models of the same capacities. Welded construction throughout. Capacities, 2½ and 4 cu. yd. Lengths, 7 to 10 feet. Body width, 72 inches.

PERFECTION
Series-7400
STEEL PLATFORM STAKE BODIES



Built to give maximum loading space. New features such as low mounting height and all-steel understructure assure definite working advantages and repair savings.

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BULLETINS
AND NAME
OF NEAREST
DISTRIBUTOR

THE PERFECTION STEEL BODY CO.
GALION, OHIO

PERFECTION
TRUCK BODIES AND HOISTS



● HARD-WORKING SHOVELS CAN WORK HARDER . . . equipped with **BRIGGS OIL CLARIFIERS**



FOR INSTANCE—Look at this record

This model 801, Lima shovel . . . powered by a 190 HP Waukesha-Hesselman Diesel equipped with a Briggs Clarifier has operated 96 hours weekly for three years. In this time the only wear-caused replacement was one set of new rings.

The operator of the shovel estimates that, without the Briggs Clarifier, oil would need changing weekly. As it is—oil and refill cartridges are changed every six to eight weeks. He also estimates that the Briggs Clarifier cuts overhauls 50%.

This is the kind of efficiency, savings and trouble-free performance that Briggs Clarifiers offer to operators of internal combustion engines of all sizes and types.

Want these benefits? Let the Briggs distributor in your locality tell you what Briggs Clarifiers can and will do for you. He knows oil filtration—he can help you.

Write for new catalogs. Just tell us the type and size engine you operate. We'll send you the proper literature that tells you HOW and WHY Briggs Clarifiers do a better oil filtration job.

Briggs
PIONEERS IN MODERN
OIL FILTRATION

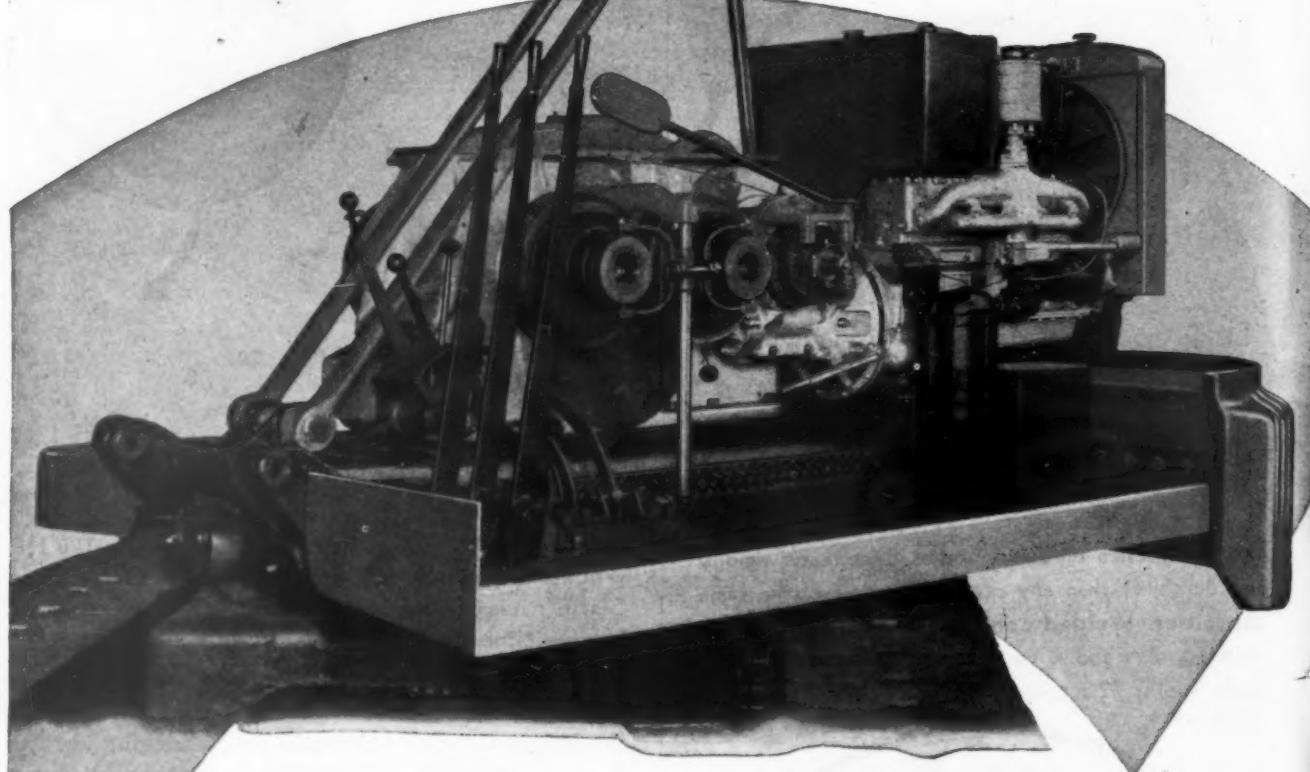
BRIGGS CLARIFIER COMPANY

GENERAL OFFICES, WASHINGTON 7, D. C.

Distributors in Principal Cities

ROADS AND STREETS, October, 1944

Inside Story of UNIT!



Main Machinery Enclosed in One-Piece Cast Case

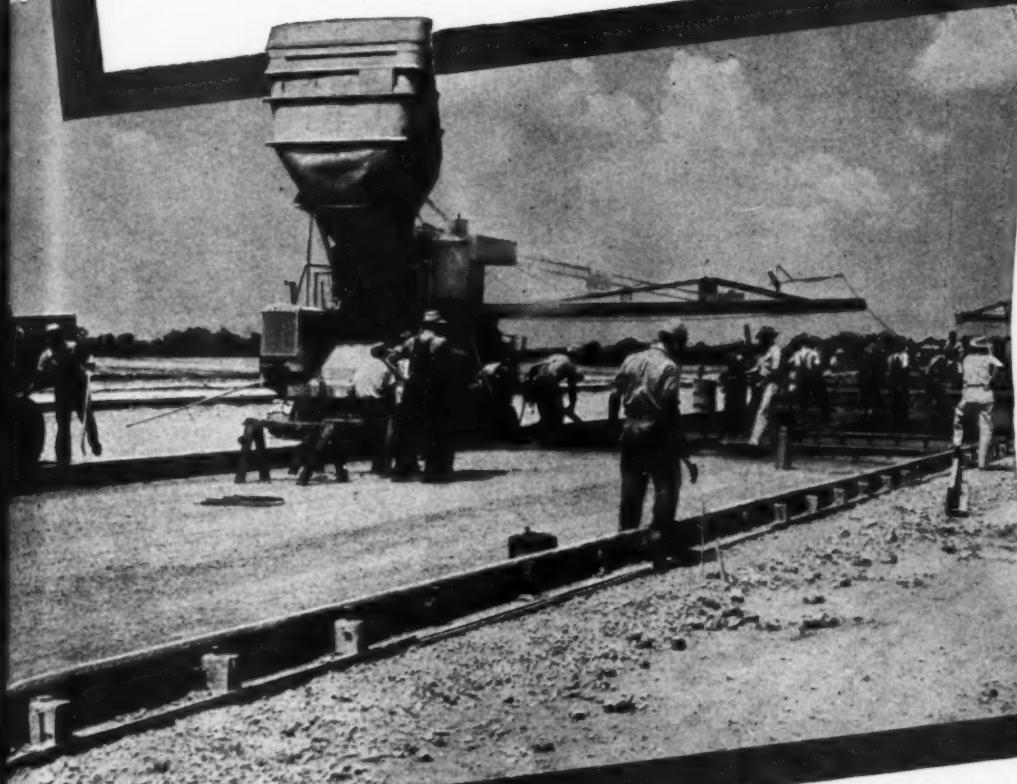
- Compact design. Operator has plenty of room.
- Self-lubricating! Dust proof! Oil tight!
- Keeps grease where it belongs. Keeps dirt out.
- Disc type clutches for smooth operation and foolproof adjustment.
- All splined and heat-treated alloy steel shafting.
- All alloy steel, heat-treated gears, drop forged or cut from bar stock.
- Anti-friction bearings throughout.
- Automotive design in a place where it counts.

UNIVERSAL UNIT MACHINERY CORP., Milwaukee 14, Wis., U.S.A.



Write UNIT today for descriptive literature.

Pave your way to POSTWAR PROSPERITY with MultiFoote Pavers



HERE'S THE SECRET
of BETTER MIXING!



The double cone drum of the MultiFoote Paver gives end-to-end scouring action that insures a complete and thorough mix of every batch. There are no sharp angle corners where the mix can adhere and build up and be hard to clean. Openings are fitted with renewable wearing rings. Cut-away section shows drum interior and blade design.

YOUR share of the three billion dollar annual postwar highway construction program will be more profitable if you have the combination of features provided by MultiFoote Pavers for speeding up production. Their records for speed and low cost paving of highways and airports everywhere are the reasons why there are more MultiFoote Pavers in service than any other make.

The big, wide, solid skip, which can take the battering of any batch truck,

assures positive, fast charging without spilling. Double cone drum provides complete and thorough mix of every batch. Water system is simple, accurate and independent of water pressure. Rotary discharge takes only a quarter turn to kick concrete into the big bucket ready to speed out the long boom to be discharged. High operating platform permits greater visibility and faster, more accurate work.

Write for details or see your local Multi-

FOOTE COMPANY, INC.
NUDA • NEW YORK

The World's Largest Exclusive
Manufacturers of Concrete and Black Top Pavers

MultiFoote Pavers Conform to
A. G. C. Standards and Specifications

MULTIFOOTE CONCRETE PAVERS

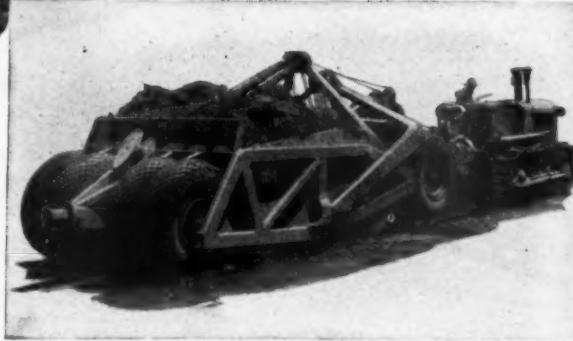




GAR WOOD ROAD MACHINERY



Make your blueprinted plans
NOW for postwar earthmoving . . . make
sure Gar Wood 2 and 4 Wheel Hydraulic
Scrapers, 4 Wheel Cable Scrapers, Hydraulic
and Cable Dozers and Trailbuilders,
Hydraulic and Cable Rippers and
Tamping Rollers are included in your
Equipment Plans. This is double
assurance that your planning is up to
the minute.



**Look to Gar Wood
and BE READY**



GW ROAD MACHINERY
is Sold Through
ALLIS-CHALMERS
Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

DETROIT 11, MICHIGAN





More Snow...Less Man-Power...

Won't "Stump" **FWD** "Truck-Power"

Husky FWDs like this make a clean sweep of the snow removal problem for Douglas County, Nebraska.

SNOW, this year, will be a more serious problem than ever before on highways . . . because less manpower is available. FWDs will not be "stumped" by this handicap! They are no amateurs at snow removal . . . nor at many other heavy-duty jobs they perform reliably and economically in road maintenance and construction.

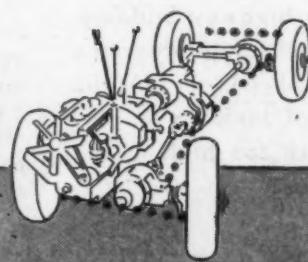
The same FWDs that served through spring, summer and fall can be snow-plow equipped and quickly converted to snow removal duty. Equipped with under-body type scrapers, the same trucks will strip ice sheets or ruts from roads.

With power and traction on all four wheels, plus ruggedness that withstands toughest service, FWDs continue to deliver more "truck-power" as the effective answer to less manpower for highway service.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wisconsin
Canadian Factory: KITCHENER, ONTARIO

**Four-Wheel-Drive . . . THE BACKBONE
OF RUGGED, DEPENDABLE TRUCK HAULING POWER**

The true application of four-wheel-drive with center differential provides ability to get through under difficult conditions — increased surety and safety on the road — lower operating cost per ton-mile — long service life.



Trade-Mark of the Original and
Exclusive Builders of
Four-Wheel-Drive Trucks.

[This message is appearing in a number of National Publications in the public interest]

ARE YOU GETTING THE HIGHWAYS YOU ARE Taxed FOR?

WHETHER YOU DRIVE a car . . . a truck . . . or a Truck-Trailer . . . do you realize that you may not be getting the highways you've been taxed for?

You've probably heard that highways are subsidized by the Government, but this is not the case. You and every other highway user pay your way . . . and more, too.

A study by the Federal Coordinator of Transportation showed this conclusively.* Figures in this study reveal payments in excess of highway costs, for one year alone, amounting to \$2.00 for a passenger car and up to \$314.00 for a Truck-Trailer.



The report of the Public Roads Administration for 1942 reveals that highway taxes collected by the States for that year amounted to \$1,537,336,000 and expenditures were \$1,469,982,000, which included the sum of \$204,165,000 of highway tax funds allocated for financing unemployment . . . relief costs . . . education . . . sums for



general State distribution . . . and other miscellaneous purposes.

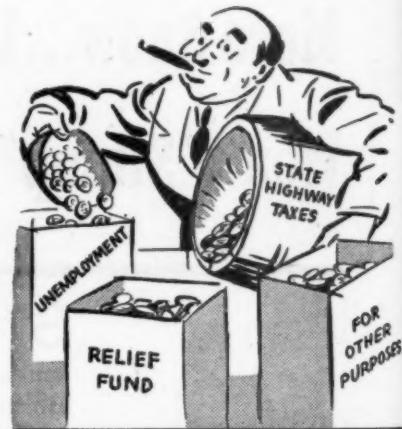
This has been going on for years. From 1934 through 1942 the total of highway taxes used for purposes other than road building and maintenance amounts to more than one and one-half billion dollars—a sum sufficient to pave eleven concrete roads 22 ft. wide from Maine to California.

It is not contended that expenditures for education and relief-work are not worthy, but the money you have paid in taxes as a highway user should not be raided to finance other projects which are the responsibility of the public as a whole. Taxes levied for highway use should be expended solely for highways!

Isn't it logical to assume that, whenever highway funds are expended for any other purpose, either (1) the highway building, maintenance and safety programs are being sacrificed, or (2) the present rates of taxation on motor vehicles are too high in the offending States?

If you live in Iowa, Oregon, West Virginia, Kansas, Missouri, California, Colorado, Idaho, Michigan, Minnesota, Nevada, New Hampshire, South Dakota or North Dakota, your taxes are protected by State constitutional amendments which guarantee they are not to be used for anything other than highway purposes. Maine, Nebraska and Washington are expected to join these fourteen States soon to bring the total to seventeen.

But, if you live in one of the 31 other States, now is the time to insist to your Legislators that your



State adopt similar amendments to stop dipping into highway funds for other purposes. The automatic result of such action would be either—(1) reduced motor vehicle taxes, or—(2) the construction of more and better highways.

*The late Joseph B. Eastman, when Federal Coordinator of Transportation, stated, "For all practical purposes it may be said that motor vehicle users as a class have paid their way since 1927." (Page 26, "Public Aids to Transportation," Volume I, U. S. Government Printing Office, Washington—1940).

World's Largest Builders of Truck-Trailers

Service in Principal Cities

FRUEHAUF TRAILER COMPANY

DETROIT 32

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regon,
souri,
Michigan
New
North
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OTHER
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32

High
bene

There's a Blizzard on the way...

Ready or not!



*As the barometer slides down, the snow piles UP
—just the spot for a Snogo. Snogo throws the
snow off the road. No banks build up to narrow lanes which
delay traffic and endanger lives. Workers get to their
jobs, children get to school—and back safely—
roads are open for fire department and the doctor,
and winter business goes on better than usual.*

*Highway officials should plan to give their communities the
benefits of better snow clearance—Snogo clearance.*

KLAUER MANUFACTURING CO.
DUBUQUE, IOWA

SNOGO



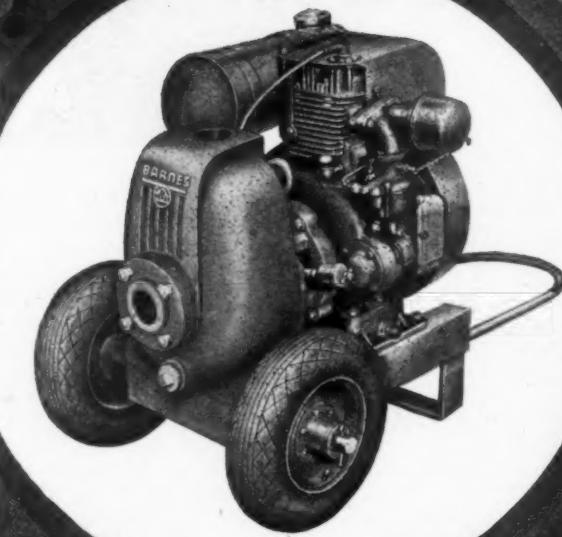
**A SNOGO For
EVERY BUDGET**

All Set to GO!

.... Barnes offers you the facilities of a completely modernized plant resulting from heavy wartime pump production (10 times greater than prewar levels), and an experience of working to the rigid precision standards of the Armed Forces.

.... Twice recognized with the Army-Navy "E" Award for production "excellence", this same highly skilled organization stands ready to serve your requirements.

.... AND, all set to GO is the newly designed and engineered line of Self-Priming centrifugals, diaphragm and plunger pumps - to give you - "More Gallons of Water for Your Pumping Dollar."



DISTRIBUTORS—If you are looking for a new line, with vigorous hard hitting selling support, contact us immediately. A number of territories are still available. Write, wire or phone.



BARNES MANUFACTURING CO.
Quality Pump Manufacturers for Nearly 50 Years
MANSFIELD, OHIO

WELLMAN WILLIAMS TYPE BUCKETS

BUCKET QUALITY BACKED BY TWO FAMOUS NAMES

Williams Buckets have been famous for nearly 40 years for their many mechanical features.

Since 1931, Williams Buckets have been built by Wellman, known for many great engineering achievements in the heavy iron-ore, coal, and steel industries. The welded construction which featured Wellman custom-built buckets for extra heavy steel mill service, is now used in all

Wellman-Williams Buckets
FOR LONGER SERVICE WITH
LESS MAINTENANCE COST

Built in Multiple Rope, Power
Arm, and Power Wheel Types
in $\frac{1}{2}$ yd. to $16\frac{1}{2}$ yd. capacities.

The Wellman Engineering Company

7006 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities



Send for Free Bulletin
Tell us about your particular requirement and we will send full description and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

LOOK AT THESE SPEEDS!



THRU 3 FT. OF
HARD SNOW



WIDENING-
OUT



You clear more miles of snow per hour—open roads much faster—when powerful Walter Snow Fighters patrol your highway system.

These rugged units smash through road-blocking drifts—hurl snow far to the side—speed widening-out. They enable you to get snow cleared away before it packs and freezes into dangerous ruts. They gain you extra time for opening more miles of secondary roads, by clearing main highways faster. The Walter 250 H.P. Snow Fighter, for example, opens a 28 ft. width in ONE pass—clears a two-lane road in ONE round trip!

No other equipment can equal a Walter Snow Fighter in snow-removed-per-hour—because no other equipment has the unmatched power and traction provided by the exclusive Walter Four-Point Positive Drive. Three automatic locking differentials proportion the tremendous motor power to each of FOUR driving wheels according to their traction at any instant. There is no wheel-spinning, side-slipping or stalling to reduce speed.

For the complete story on Walter Snow Fighters, send for detailed literature.

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.



WALTER
SNOW FIGHTERS



BACK OF EVERY ATTACK...

Preformed wire rope

GIVES BOMBER PILOTS SPLIT-SECOND CONTROL

A pilot flies his bomber through black bursts of flak toward an enemy target. Suddenly the bombardier's voice comes through the intercom, "On target!" Then, "Bombs away!"

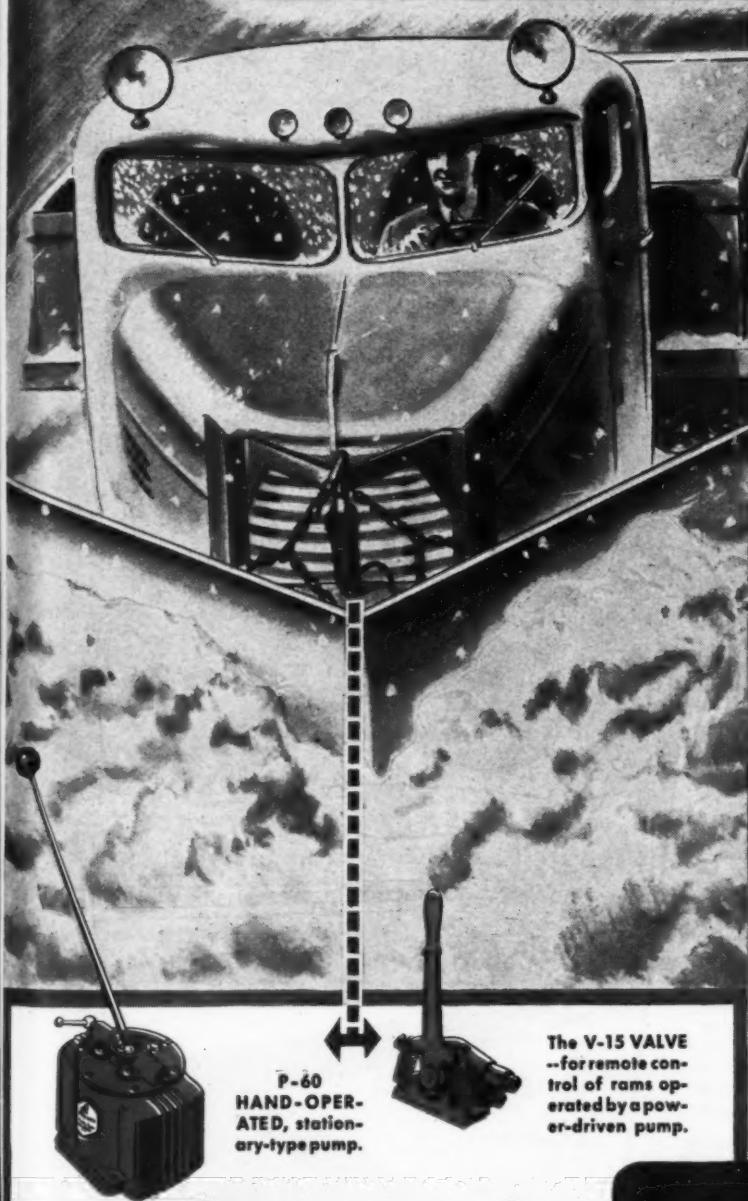
From take-off to target, the bomber's engines, rudders, bomb releases are controlled to split seconds by Preformed wire rope. Thousands of feet of it go into the rigging of a bomber.

Every foot of it on all our fighting planes is Preformed—because only this superior wire rope gives the long life, the never-failing action airplane controls must have.

Preformed is proving in the sky—as it has proved on sea and land—that it is the tough wire rope for the tough war jobs. Back of every attack, Preformed is in there fighting.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE
ROADS AND STREETS, October, 1944

Let BLACKHAWK Help You Blitz the Blizzards



P-60
HAND-OPER-
ATED, station-
ary-type pump.

The V-15 VALVE
--for remote con-
trol of rams op-
erated by a pow-
er-driven pump.



A Product of **BLACKHAWK MFG. CO.**
Dept. RS, MILWAUKEE 1, WIS.

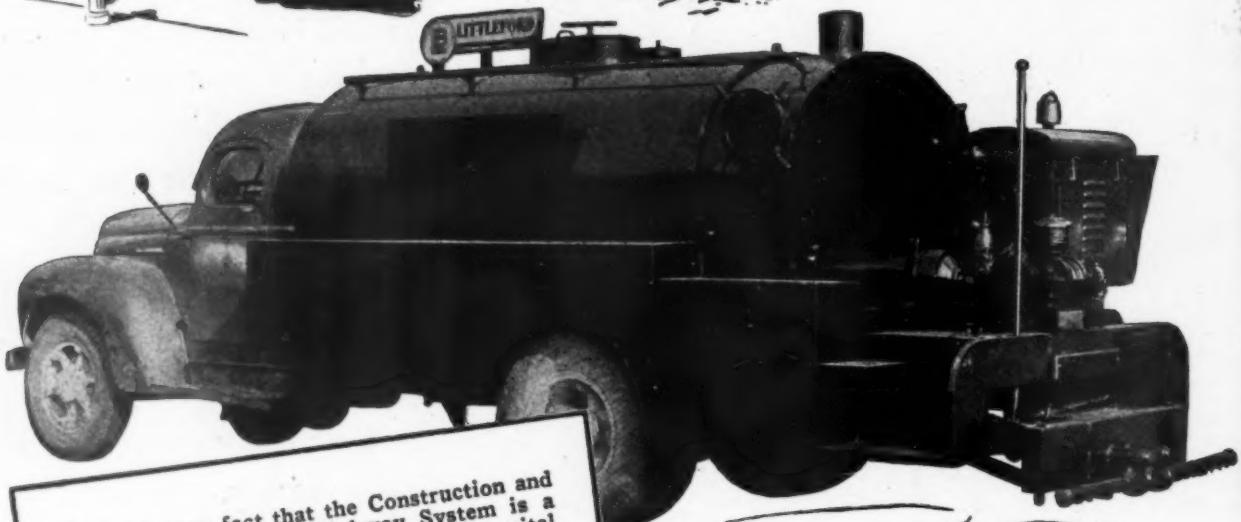
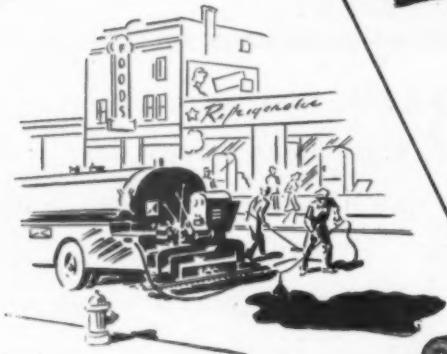
A COMPLETE
RANGE OF
RAMS is avail-
able for snow-
plow service.

P-104
POWER-DRIV-
EN PUMP. Op-
erates from
fan belt or
crank shaft.



BLACKHAWK
Hydraulic Equipment

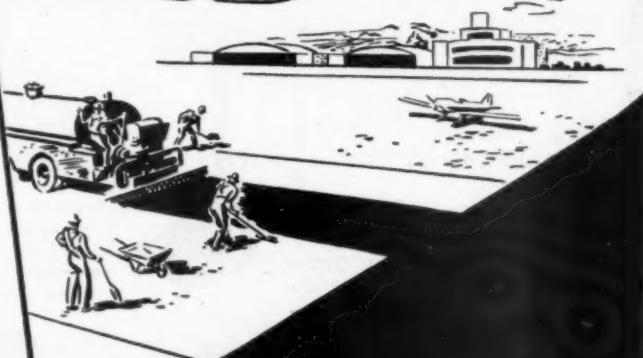
PRESSURE DISTRIBUTOR



It's a known fact that the Construction and Maintenance of our Highway System is a vital must for Post War. It's also vital to have the best equipment to do the work, to speed up the program and keep the cost at a minimum.

This is where the Littleford "Spray Master" Pressure Distributor fits into the picture. The "Spray Master" is the most modern spraying unit yet designed; its simplicity and efficiency of operation leads the field. Its Utility, too, makes it a unit necessary for the Construction and Maintenance of Highways, Roads, Runways, etc. With its Spray Bar up to 24 feet in width. Hand Spray Attachment, Transfer facilities, no job is too large or small to handle.

For Better Roads, use the best Equipment — Littleford Black Top Construction and Maintenance Equipment.



LITTLEFORD

LITTLEFORD BROS., INC., 454 E. PEARL STREET
CINCINNATI 2, OHIO



Marmon-Herrington Airborne Tanks **SPEARHEADED NORMANDY INVASION**

FROM designing and building trucks, to the production of airborne tanks *might* seem a long distance for any manufacturer to travel. The design and production problems *might* seem to be dissimilar.

But not for Marmon-Herrington.

For Marmon-Herrington has always built unconventional types of vehicles—*All-Wheel-Drive* trucks, track-laying tractors and tanks, even before the war began.

So, early in the war, when military strategy an-

ticipated the need for a large number of light, highly maneuverable airborne tanks for invasion operations, it wasn't strange that Marmon-Herrington was asked to build them. Nor was it strange that they performed with great effectiveness when carried in giant gliders over, and landed *behind enemy lines*.

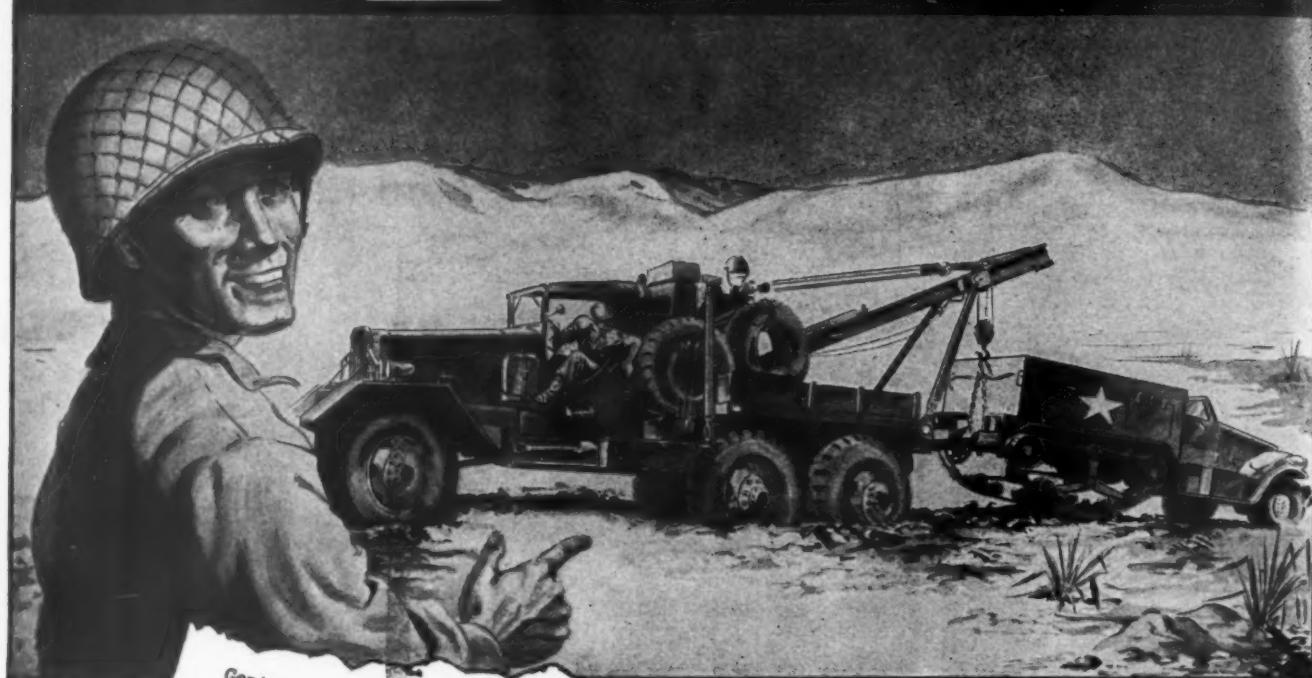
Our real business, however, is *trucks*—and we hope it won't be long until we can build all our customers need of them, for the many peace-time projects delayed by war.

* BUY MORE IN '44... WAR SAVINGS BONDS *

MARMON-HERRINGTON *All-Wheel-Drive* TRUCKS

MARMON-HERRINGTON CO., Inc., INDIANAPOLIS 7, INDIANA
Cable Address: MARTON

THAT'S MY POSTWAR TRUCK



Gentlemen:

An American Army officer told me of the hard knocks and strains encountered daily by some of your heavy equipment, in hauling over trails impossible to negotiate with some of the regular Army models supplied by one or your well-known competitors, and aroused my curiosity to the point of writing for literature about Ward LaFrance non-military vehicles.

I would especially like illustrations or specifications concerning your heavy-duty gasoline and Diesel powered commercial models used in over-the-road transportation operations. Any information you may care to mail me would be gratefully appreciated and I can assure you it will pass into hands that may be vitally interested in Ward LaFrance as a possible solution in trucking problems.

Very truly yours

Instructor, Operation
Heavy Transportation Equipment

This letter is typical of numerous unsolicited commendations, received from men who know trucks and who have seen Ward LaFrance military models at work at the fighting fronts.

We have been authorized to resume the manufacture of a limited number of civilian trucks during 1944, but, of course, military demands for Ward LaFrance trucks come first. When Ward LaFrance civilian models do become available, they will offer

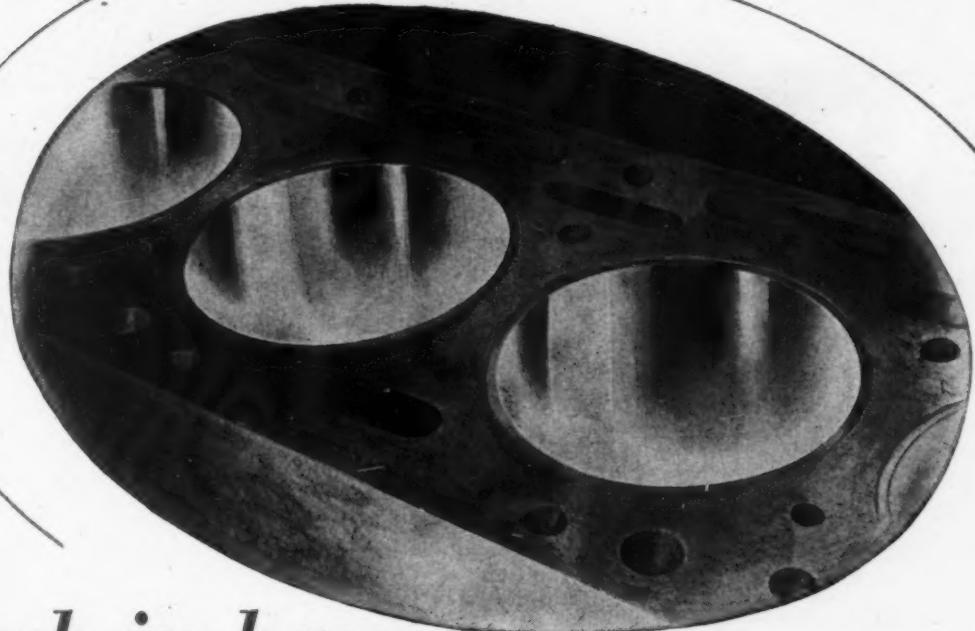
an unusual opportunity to standardize on trucks known the world over for extra stamina and dependability... on a unique plan which no fleet owner will want to overlook. For further details, write our Sales Department today.



WARD LAFRANCE

TRUCK DIVISION

AMERICAN INDUSTRIES, INC., BINGHAMTON, NEW YORK



Reach in here for 350,000 Extra Miles

Extra miles . . . extra hours . . . are in this engine because PORUS-KROME* has been applied to the cylinder walls. This is where the greatest wear occurs in engines and PORUS-KROME extends the life of these walls 4 to 20 times.

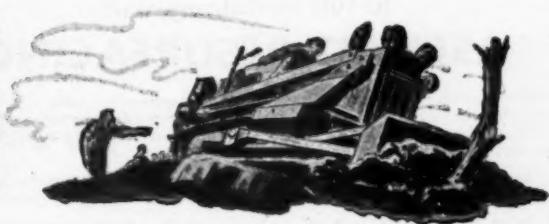
The ability to resist corrosion is inherent in chromium and is well known. The ability to resist cylinder wear, also, is inherent in this new form of chromium . . . PORUS-KROME . . . and is being demonstrated daily in thousands upon thousands of engines in use by the Army and Navy, and in essential civilian operations.

PORUS-KROME, produced by the Van der Horst process, is different from ordinary chrome because it has tiny open pores and channels in the surface. These pores and channels serve as reservoirs to hold lubricating oil . . . and then feed it back to the cylinder walls as needed. This excellent lubrication reduces wear, scoring and scuffing to a minimum.

Both corrosion and wear . . . those two enemies of long engine life . . . can be defeated at last. You can multiply the cylinder life of your engines 4 to 20 times . . . specify PORUS-KROME in engines you buy.



PORUS-KROME is pure, hard chromium, applied to cylinder walls and other bearing surfaces by the patented Van der Horst process. It resists corrosion and wear in cylinders better than any known metal. Records prove that it multiplies cylinder life four to twenty times.



U. S. PATENTS 2,048,578 AND 2,214,684

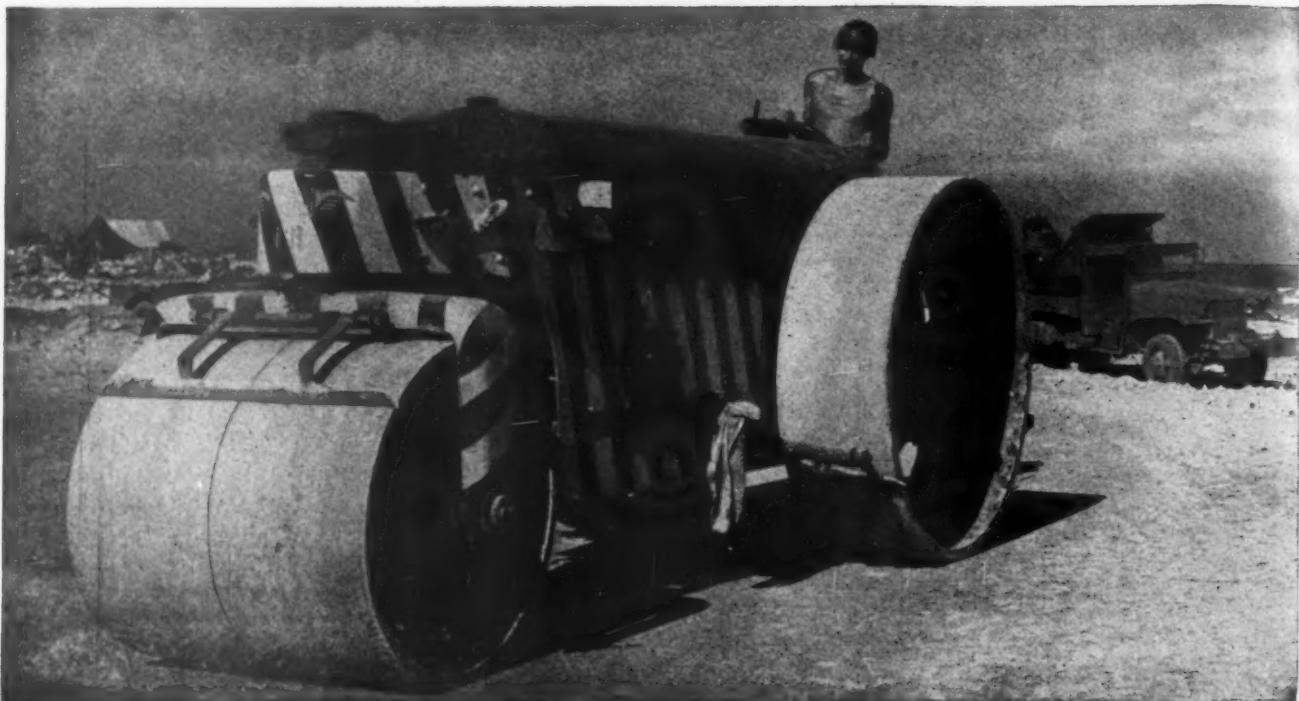
PORUS - KROME

Good for the Life of your Engines

VAN DER HORST CORPORATION OF AMERICA • OLEAN, NEW YORK • CLEVELAND 11, OHIO

AN AFFILIATE OF DRESSER INDUSTRIES

ROADS AND STREETS, October, 1944

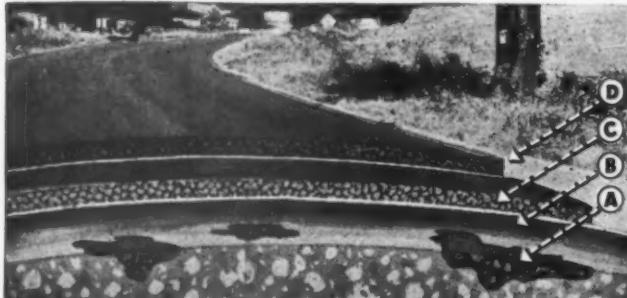


U. S. NAVY PHOTO

GALION ROLLER ON ACTIVE DUTY

THE GALION IRON WORKS & MFG. CO.

Main Office and Works: Galion, Ohio



How to restore trunk highways to full usefulness with ASPHALT-RESURFACING

MANY highway departments have found the answer to today's problem of keeping highway systems up to wartime efficiency, and preserving them for peacetime needs, by the method of asphalt-resurfacing described here and pictured in the cross-section above.

- A. Spot Patching. Where the old highway surface is badly broken, holes are patched by filling with the same mix as used in the binder course.
- B. Prime Coat. A thin coat of cut-back asphalt, spread over the old road surface. When used, it helps to bind the asphalt to the old surface.
- C. Binder Course. An asphalt-aggregate mix. It is delivered hot from the central mixing plant to an asphalt finishing machine.
- D. Wearing Course. This is the top course, composed of asphaltic concrete with a fine aggregate. It is hot mixed, and laid by machine. It presents a smooth, water-proof, long-wearing surface which requires no seal coat or stone application.

A Standard Asphalt Representative will be glad to give all the details. Call the local Standard Oil Company (Indiana) office, or write 910 South Michigan Avenue, Chicago 80, Illinois, for the Representative nearest you.

Gasoline Powers the Attack . . . Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA)



The Balanced
VIBRATOR SCREEN
by PIONEER

Write today to

PIONEER ENGINEERING WORKS
1532 CENTRAL AVENUE • MINNEAPOLIS 13, MINNESOTA

**HAVE YOU A
COPY OF THIS
BOOK IN YOUR
LIBRARY?**

A SATISFIED CONTRACTOR TELLS HIS EXPERIENCE WITH MISSISSIPPI WAGONS

25 YEARS
OF EXPERIENCE SPEAKS!

E. R. MORRIS

MORRIS & YOUNG

CONTRACTORS

La. Nat'l. Bank Bldg.
BATON ROUGE, LA.

H. M. YOUNG, JR.

August 24, 1944

Dunham-Pugh Company
Baton Rouge, Louisiana

Gentlemen:

We are glad to answer your inquiry as to the performance of the four Mississippi Wagons we purchased from you. WE WOULD UNHESITATINGLY RECOMMEND THE MISSISSIPPI WAGON TO ANYONE INTERESTED IN HAULING EQUIPMENT OF THIS TYPE FOR THE FOLLOWING REASONS:

These four Mississippi Wagons are consistently hauling 2000 yards of dirt each 10 hour day, or 500 yards for each unit, with a fuel consumption of 14, and never exceeding 2 gallons an hour for each unit. Our hauls range from 3500 to 5000 feet round trip, and we are crossing a concrete highway going to and returning from the dump. Since our job is in low swampy country this performance is very pleasing to us.

I have been in the contracting business since 1919, and until we purchased the Mississippi Wagons I had not seen a hauling unit of this type, that was suitable for short hauls such as we are on at present, and also most suitable for 15 to 20 mile topping and gravel hauls, which makes them an all round hauling unit.

This, together with their low first cost, cheap replacement of parts, ability to get over soft ground without cutting up the haul road, plus their fast snappy performance with very unskilled operators, has pleased us very much with our investment.

Yours truly,
J. R. Morris
MORRIS AND YOUNG



A MISSISSIPPI WAGON on a current Morris & Young job at Lottie, La.

**FIRST HAULING UNIT
SEEN SUITABLE FOR
LONG OR SHORT HAULS
MAKING "AN ALL ROUND
HAULING UNIT" FOR
CONSTRUCTION, OR
HAULING TOPPING
OR GRAVEL.**

A man with 25 years' experience in the contracting business can speak with authority. That is why we take pride in reproducing the letter above. It is but further evidence that the MISSISSIPPI WAGON is the "world's most modern hauling unit" and a natural money-maker on long or short hauls. We ask you to investigate the MISSISSIPPI WAGON and see how it will fit into your contracting program.

Postwar competition will be tough, but not for the owner of
MISSISSIPPI WAGONS

the "world's most modern hauling unit."

Contact your nearest International Industrial Power dealer for complete information on MISSISSIPPI WAGONS.

MRS 
MANUFACTURING CO.
JACKSON, MISSISSIPPI



with **VICKERS** Hydraulic POWER STEERING

Just two fingers turn the steering wheel and the front wheels follow exactly . . . the Vickers Hydraulic Power Steering System does the work instead of the driver. And this heavy truck steers just as easily over rough ground as on smooth pavement. No shock load can be transmitted from the front wheels back to the steering wheel . . . thus relieving the driver of considerable fatigue resulting from constant road shocks he must absorb with the conventional mechanical steering gear.

Among the many other advantages of Vickers Hydraulic Power Steering are: easy application to existing chassis designs, automatic overload protection for both steering linkage and hydraulic system, wheel "fight" is impossible, automatic lubrication, and 14 years of successful operating experience on trucks, buses, road machinery, etc. For all the facts about Vickers Hydraulic Power Steering, ask for the new Bulletin 44-30.

VICKERS Incorporated • 1432 OAKMAN BLVD. • DETROIT 32, MICHIGAN
Application Engineering Offices: CHICAGO • CLEVELAND • DETROIT • LOS ANGELES • NEWARK
 PHILADELPHIA • ROCHESTER • ROCKFORD • TULSA • WORCESTER

VICKERS Hydraulic POWER STEERING is
Simple . . . Compact . . . Easily Installed

ENGINE DRIVEN
PUMP



POWER STEERING BOOSTER



OVERLOAD
RELIEF VALVE

ARE YOU ALL SET FOR V DAY?

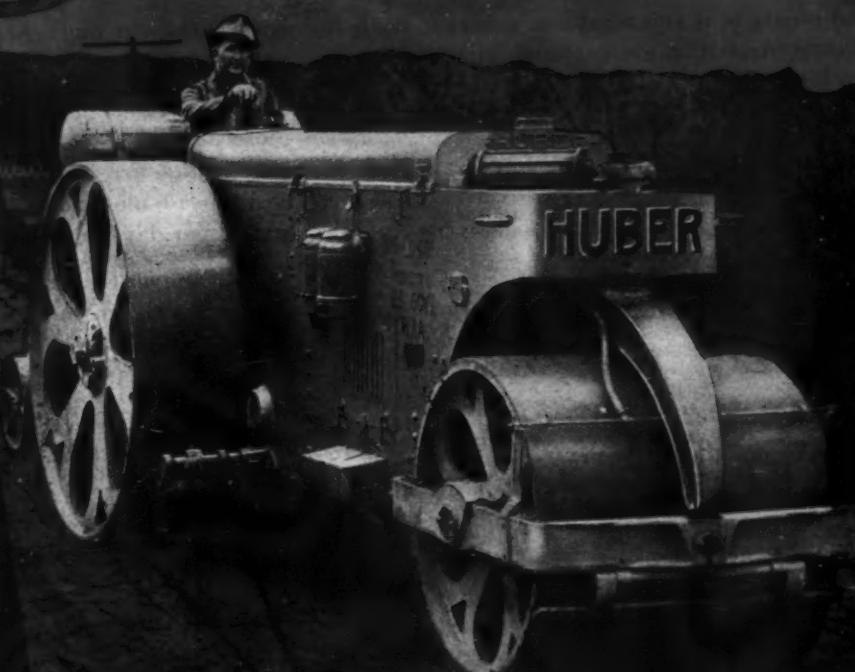
HUBER is with a Road Roller that has had every feature tested and proven under the most severe of operating conditions.

This new HUBER Road Roller, which is giving such a good account of itself in the war zones, will be available to you as soon as the war ends.

To appreciate it—WAIT AND SEE IT!

THE  MFG. COMPANY • MARION, OHIO, U.S.A.

DISTRIBUTORS
if your Territory
is open
you will find the
HUBER
Franchise desir-
able. Why not
write?



HUBER ROAD ROLLERS

Soft going calls for O-P-E-N-C-E-N-T-E-R traction



Euclid Model F 12-yard
bottom dump with Goodyear
Sure-Grip on track
for idler wheels and trailer
— nonskid correctly re-
versed on trailer.

Grip — and plenty of it — is what moves bigger earth yardages faster. And that means tough tires with a clean, sharp bite that won't clog up and spin helplessly under peak loads.

Top tire for such jobs is Goodyear's Sure-Grip with the great, time-proved O-P-E-N C-E-N-T-E-R self-cleaning tread which has no holding pockets, no mud traps to gum up.

See those big, wide, unblocked channels on the Good-

year Sure-Grip pictured here? They slice out dirt, mud and stones — leave the massive lug bars free and clear to bite deep and keep pulling in any going!

More and more contractors are specifying this great, longer-duty tire because it gives more drawbar pull, more speed, more round trips per shift, more yardage moved per day — *more work at less cost!*

What's more, Goodyear's exclusive multiple-compounded construction and the extra strength of Goodyear's Rayotwist cord carcass help make these the longest-lasting, hardest-working tires ever to roll a prime mover.

Best way to check these claims is to ask the men who have changed to Sure-Grips. When you do, chances are you'll want Goodyears on all your units.

Sure-Grip, All-Weather, Rayotwist-T.M.'s
The Goodyear Tire & Rubber Company

A PRODUCT OF GOODYEAR RESEARCH



HARD ROCK
LUG
for all rock work

ALL-WEATHER
EARTH-MOVER
for drawn vehicles

SURE-GRIP
for drive wheels

GOOD YEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

ROADS AND STREETS

October, 1944, Vol. 87, No. 10

Big Pennsy Job Previews P-W Methods

Highlights of \$3,000,000 divided-lane highway project on U.S. 22 in Eastern Pennsylvania, where four contractors and subs pitted modern equipment against wartime difficulties

MODERN road building machinery, to the tune of nearly a million dollars' worth, was on parade this past summer on the William Penn Highway (U.S. 22) east of Harrisburg. Involving 1,200,000 cu. yd. of heavy grading in rolling country and 270,000 sq. yd. of concrete pavement, this project is probably the largest eastern road job of 1944. When completed late this year it will help ease serious congestion and greatly speed trucking along the Penn Turnpike-Harrisburg-New York City axis.

The route locally serves as an access road to Indiantown Gap Military Reservation and other war activities in the Harrisburg area. From 6,000

to 10,000 vehicles daily, 30% trucks, have recently used the existing route.

The project consists of widening and double-tracking the old roadway for 3 miles at the outskirts of Harrisburg, then 13 miles of new location graded for dual construction but paved only on one side for the present. Four contract sections were let as follows: 2.48 mi. to James Julian, of Wilmington, Del., at \$402,825; 5.73 mi. to Buffalo Gravel Corp., Harrisburg, at \$717,378; 5.87 mi. to Union Bldg. Const. Co., Passaic, N. J., at \$919,910; and 2.42 mi. to Hempt Bros., Camp Hill, Pa., at \$366,385. Julian's contract covers 4-lane construction, the other contractors grading for 4 lanes and paving 2 lanes. About

\$700,000 is estimated for right-of-way costs.

The new highway is of advanced conception. In spite of rolling terrain there are only 5 curves in 12 miles, all of which are 1 degree. Maximum grade is 3% and minimum sight distance 900 ft. The two 24-ft. concrete pavements in the ultimate construction will be separated by a 4-ft.-wide raised divisor consisting of 15-in. white (sloping) concrete reflecting curb on each side with plain concrete between.

Concrete pavement is 9 in. uniform on main lanes and turnout lanes, and includes bar mat reinforcement, dowels at expansion joints and tie bars through the keyed center-line.

On the Buffalo Gravel Corp. section Ralph Myers' thirteen 33-yd. scrapers, hauling from cut to valley fill, moved as high as 4,500 cu. yds. of tough clay and shale in 10 hrs. on 1800-ft. average haul, with two pushers leading in alternate directions





(At side): James Julian's paving outfit. Note unusually stiff $5\frac{1}{4}$ -gal. mix piled up ahead of spreader screw. Also sheet-metal keyway form fastened against the paving form; expansion joint assembly with near end of dowels bent in semi-circle; and metal braces used to hold joint strip in position

The top 6 in. of the grade in all fills and in cuts where it appeared necessary was made of selected shale from the excavation. The project also included a considerable yardage of bituminous surface on 8 in. of stone for crossroad approaches.

The old winding road, which the new route roughly parallels and crosses at points, will be turned over to the townships as a local road.

An unusual detail in the planning occurred at the east end of the project where 150,000 cu. yd. of surplus earth excavation was "wasted" by placing it in rolled layers as fill (max. depth 25 ft.) for an interchange ramp and continuation of the main line on a section not at present approved for construction.

Julian's 2½ Miles Involved House Moving

James Julian's contract at the Harrisburg end (Geo. Zuver, supt.) consisted entirely of rebuilding and widening the old roadway through an outlying residential section. Before much dirt could fly numerous abutting homes and store buildings had to be moved out or set back and drainage and sewer lines installed. Extensive wall construction was necessary where hill-top grades were cut down, rubble masonry being used for good appearance. Julian dug sewer lines with a pull-shovel and trenched for under-drains with an ancient resurrected ditcher. His fine-grading outfit included a modern formgrader and subgrader. Concrete pavement was placed under traffic in 12-ft. lanes using a 34-E paver, screw-type spreader and oscillating screed finisher. But no bullfloat, this item being on Julian's shortage list.

driving form pins into the hard, dry, shale subgrade with a jackhammer and pulling pins with three 2-man teams using two types of form pin pullers (see photos).

Buffalo's batching bins, located conveniently on the shoulder of the new grade and at an access crossroad midpoint on the job, was designed to deliver 60 batches an hour. It included a cement bin and elevator supplied through a high-level dumping hopper and a 150-ton batch bin served by a 2-yd. clam. This set-up saved time since batch trucks could be loaded without having to turn, climb or cross rough ground.

With the aid of this modern plant, Buffalo's best paver run was 2163 ft. in 10 hours, but the firm had its share of such troubles as lack of trucks, too few and poor quality of workers, etc.

Buffalo Gravel Corp. sublet one barrel-type arch bridge and one 6-ft. span arch culvert to G. A. and F. M. Wagman, who used conventional arch forming and placed transit mixed concrete using a crane and 1-yd. drop bucket.

Ralph Myers Moved Dirt for Buffalo

The heavy cuts and fills on the Buffalo Gravel Corp. section made an ideal situation for an earth moving specialist with a fast outfit. Ralph Myers, of Salem, Ind., who measures up to this description, rented his organization to the Buffalo firm and between May 15 and July 15 moved 250,000 cu. yd. out of 400,000 cu. yd. total.

His equipment included seven 33-
yd. scrapers, three 18-
yd. scrapers,

Julian, like all the contractors, employed available labor-saving equipment to the fullest, making the best of 60 to 75 men when he needed a hundred



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eighteen heavy tractors, two rooters (1 light, 1 heavy), seven sheepfoot units (2, 3 and 4 double-drum), and one 10-ton smooth roller.

The 33-*yd.* machines worked from the heavy cuts into valley fills, the bulk of the yardage requiring about 1800 ft. haul. Much of the cut yardage was hard shale with some rock, characterized by Pennsylvania's chief highway engineer, C. H. Buckius, as "the worst stuff I ever saw moved with big pans." Two push tractors helped load toward the dump, one machine also dropping a heavy-duty one-tooth rooter during spare moments. Two pushers were often used in tandem on a single big scraper to load without stalling. An average 3,500 cu. *yd.* was moved in a 10-hr. day, with 4,500 cu. *yd.* on the best day.

The Ralph Myers outfit here, with Foster Myers in charge and J. S. Ingram, superintendent, was a remarkably smooth organization, due to the Myers credo: Assemble the biggest and best equipment available, and get experienced operators who can work together. The way the scraper operators worked down the bank slopes, spotting their successive cuts so that almost no dressing up with the motor grader was necessary, is an example of the Myers finesse.

Union Bldg. Const. Co. Project

This Passaic, N. J., firm under Superintendent J. A. Johnson had the third section. Its \$919,910 bid covered 5.87 mi. of 4-lane grade, 394,000 cu. *yd.* roadway excavation, 88,000 sq. *yd.* concrete pavement and 6,759 cu. *yd.* culvert concrete and other items.

Union struck considerable rock in cuts on which it put two large compressors, one with two wagon drills and one with hand-held drills. Earth

(Below): Noon-time grease-up. Ralph Myers' scrapers were serviced from a truck equipped with a modern 5-reel, high-and-low pressure greasing outfit



"Toughest stuff I ever saw moved with big pans," said Pennsy dept. of highways chief engineer C. H. Buckius, of the hard shale and rock moved by Myers' scrapers. Plenty of rooter work needed, with double-header pushers at times

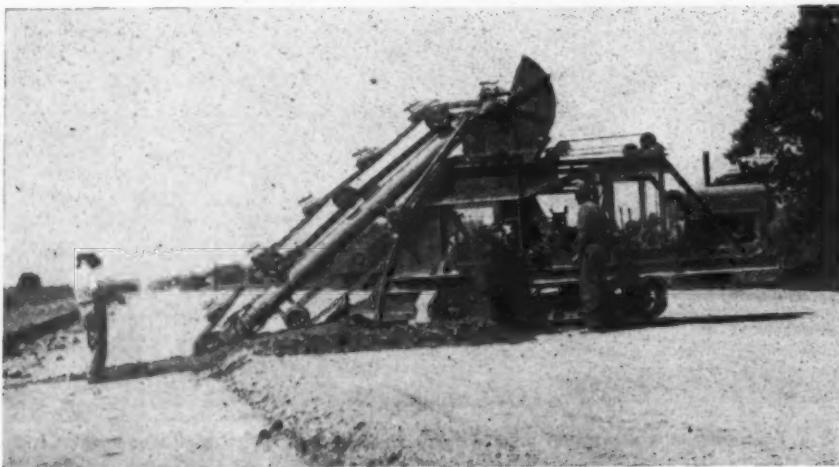


Four dual-drum sheepfoot units in tandem—typical of Myers' high-speed methods

"Watch me!" said this grader operator (on Union's contract), whose specialty was dressing up high cut banks and leaving them nicely contoured



Hempt Bros. used a 2-*yd.* shovel and several types of dump trucks and trundle wagons to move dirt from this 30-*ft.* cut to an adjoining 150,000 *yd.* fill

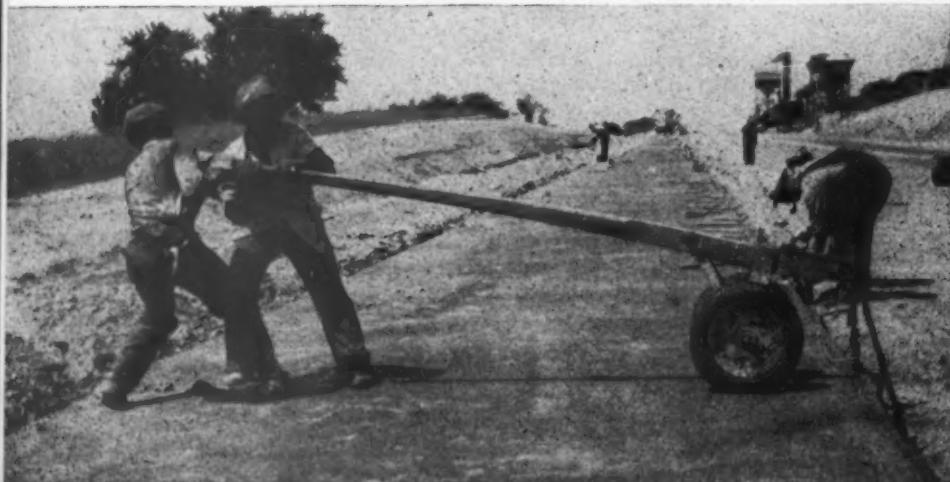


Trenching into compacted clay subgrade for herringbone drains was "pie" for this modern ditcher. Buffalo contract



was moved from cuts to valley fills on a 6,000-*ft.* haul with six 12-*yd.* wheel-tractor-drawn scrapers assisted by a rooter-equipped dozer push-loading in alternate directions, and a motor grader dressing cut slopes. The tough character of the clay and hard pan soil is indicated by the slow loading time for these high-speed-type scrapers, which required from 1½ to 2 minutes even with a heavy pusher. Several small tractor-drawn scrapers worked short hauls, and fill compaction was handled by two dual sheep's-foot units, a dozer and a grader.

Two ways to pull form pins—Buffalo contract



An important detail in building the four large fills on the Union job was that of backfilling and compacting carefully around large barrel arch structures.

The three arch culverts, of 30, 30 and 32-*ft.* span, were concreted in a number of ways. One arch was poured largely with concrete mixed in a truck-mixer stationed at the site. Batched sand and gravel were hauled out to the job and cement added as the dry materials were fed into the drum via a portable belt loader. Considerable rock interfered with the mechanical ditcher on drain lines.

Union's subgrading and paving outfit included a form grader, power subgrader, and two scratch boards; 34-E dual paver; screw-type spreader, finisher and power-driven bullfloat. Two and 3-batch trucks, equipped with separate cement compartments, were employed. Union, too, was slowed up by a shortage of trucks.

Noted at Union's batching plant was a high-level water tank, filled by a booster pump from a nearby creek. In addition to supplying sprinkler trucks this truck furnished water to wet down aggregate piles, a step specified to insure uniform moisture absorption in the concrete stone.

Hempt Bros., 332,000 cu. *yd.* in 2 Miles

The Hempt contract, J. S. Anderson, supt., although covering only 2.42 miles of grade, required 332,000 cu. *yd.* of excavation. Most of it came out of a long 25-*ft.* cut, roughly half being "wasted" onto a future project, and heretofore noted, and the rest being moved 5,000 ft. into an arch-drained fill.

Two shovels worked the large cut, loading a variety of hauling units, while a second smaller cut involving 1,000 ft. of haul was handled by scrapers. The Hempt earth-moving outfit included:

2 shovels (1½ and 2 *yd.*)
2 15-*yd.* scrapers
3 dozers (1 with rooter and 1 "knocking down")

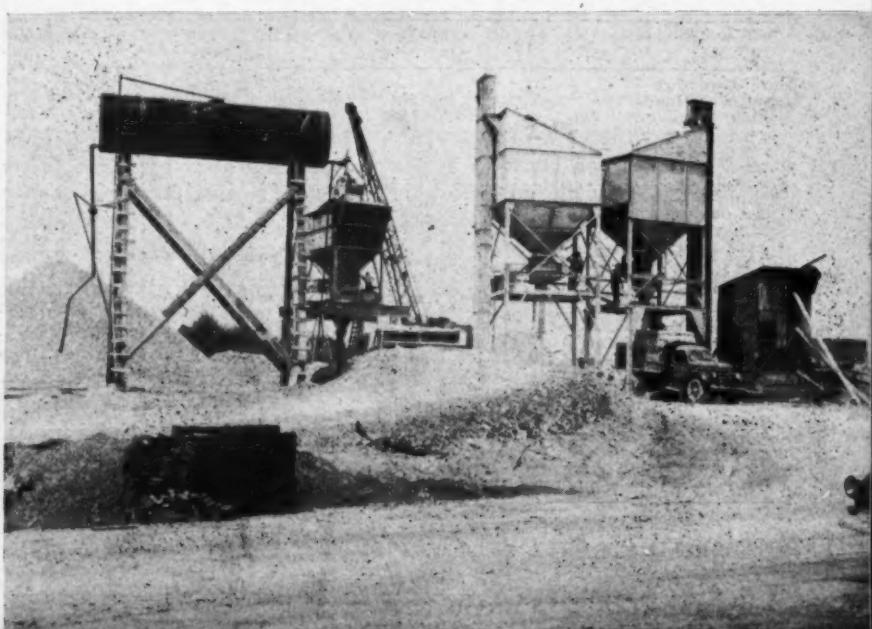


Union's 393,000 cu. yd. of excavation was moved largely by six of these scraper units, which hauled a max. of 6,000 ft. through an intervening cut to complete a deep ravine fill. (Right): Pushing form pins into hard subgrade with air, a trick first used on the Penn turnpike



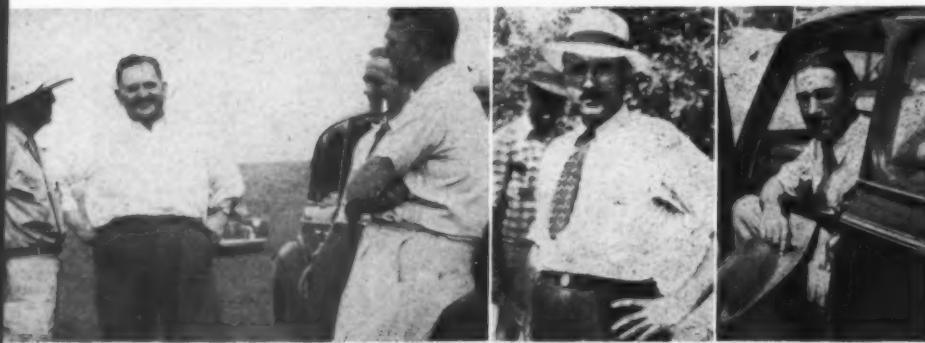
Union Building Const. Company's 34-E dual drum paver made fast time when enough men and trucks were available

All contractors on U. S. 22 job had modern bulk cement and aggregate plants. (Left below): Julian's cement elevator and bin of 168 bbl. capacity, which served one paver on 57,000 sq. yd. of concrete (Right below): Buffalo located cement bin on shoulder of new grade, for convenience. The clam was spotted on high ground to save boom length, and the cement dump also was built to take advantage of the slope





Union Building Const. Co. employed two cement bins, one for paving and one for the bridge and culvert mixtures



Kabitzing on the Buffalo section: J. S. Ingram, supt. for Ralph Myers, Inc.; Foster Myers; A. M. Stone, asst. dist. engineer in charge of combined project; C. H. Buckius, chief engineer, Pennsylvania dept of highways; contractor James Julian; H. L. Lundy, supt. of Buffalo Gravel Corp.

2 sheepfoot units (2 and 3 dual drums)

1 10-ton 3-wheel roller
3 12-yd. bottom-dump, self-powered wagons
3 8-yd. rear dump wagons
4 3-yd. dump trucks

Hempt moved a maximum of 50,000 cu. yd. in two weeks, aided by good weather and fairly easy types of soil.

Acknowledgments

The U. S. 22 job is handled by the Harrisburg District of the Pennsylvania Department of Highways, John U. Schroyer, secretary of highways; C. H. Buckius, chief engineer. R. J. Harper is district engineer with A. M. Stone, assistant district engineer and Russell S. Conrad, assistant engineer in charge of the combined project.

Contract Prices on 16-Mile U.S.22 Project in Pennsylvania

ITEM	Combined Quantity	Contract A	Bid Quantities and Unit Prices		Contract C	Contract D
			Contract B	Contract C		
Date Awarded		5/4/44	5/4/44	5/5/44	5/5/44	5/5/44
Length of Roadway	16.50	2.48 mi.	5.73 mi.	5.87 mi.	2.42 mi.	2.42 mi.
Contract Amount	\$2,406,498	\$402,825	\$717,378	\$919,910	\$366,385	\$366,385
Class 1 exca. (rdwy.)	1,177,861 cy.	58,587 cy. 0.75	393,565 cy. 0.46	393,804 cy. 0.53	331,905 cy. 0.45	
Class 2 exca. (unclass. ditches)	21,927 cy.	1,806 cy. 1.25	6,937 cy. 3.00	9,428 cy. 3.00	3,753 cy. 2.50	
Subgrade	308,758 cy.	66,957 cy. 0.20	104,106 cy. 0.12	97,339 cy. 0.12	40,356 cy. 0.15	
Shoulders	94,470 lf.	11,540 lf. 0.20	32,910 lf. 0.15	35,743 lf. 0.23	14,277 lf. 0.25	
R.C. Conc. pav. 9"	260,278 cy.	56,697 cy. 3.20	88,494 cy. 3.09	84,175 cy. 3.15	30,912 cy. 2.90	
R.C. Conc. pav. 8"	9,100 cy.	.....	5,134 cy. 2.76	3,639 cy. 3.03	327 cy. 3.00	
Hl. early conc. 9"	1,035 cy.	.....	535 cy. 3.27	500 cy. 3.60	.....
Bit. surf. 2"	24,397 cy.	9,684 cy. 0.95	7,975 cy. 0.75	6,290 cy. 0.90	1,648 cy. 0.80	
Bit. surf. 3½"	7,200 cy.	.....	.....	.....	7,200 cy. 1.20	
Native stone 8"	26,115 cy.	9,376 cy. 1.22	8,125 cy. 1.25	7,859 cy. 1.25	755 cy. 1.20	
Native stone 10"	10,776 cy.	.....	1,302 cy. 1.50	1,166 cy. 1.50	8,308 cy. 1.50	
Agg. surface	1,201 tons	.....	.....	862 tons 0.25	339 tons 3.50	
Class B. Conc. (structures)	10,136 cy.	112 cy. 33.00	2,074 cy. 30.00	6,759 cy. 30.00	1,191 cy. 26.00	
Reinf. bars	502,795 lf.	.....	94,176 lb. 0.06	352,841 lb. 0.06	55,773 lb. 0.06	
R.C. pipe	23,078 lf.	4,652 lf. 30"	7,084 lf. 72"	8,476 lf. 72"	2,866 lf. 60"	
Stone fd. underdrain, type A	37,838 lf.	6,950 lf. 0.95	14,500 lf. 0.41	14,588 lf. 0.50	1,500 lf. 0.50	
4" tile underdrain	53,420 lf.	8,610 lf. 0.90	13,951 lf. 0.70	18,620 lf. 1.00	12,239 lf. 0.90	
Subgrade drains	42,592 lf.	10,000 lf. 0.70	12,600 lf. 0.45	12,992 lf. 0.55	7,000 lf. 0.45	
White com. reflec. curb, type A	9,490 lf.	9,490 lf. 1.65	.....	.....	.....
White com. reflec. curb, type B	20,696 lf.	10,894 lf. 1.80	8,042 lf. 2.00	1,760 lf. 1.75	.....
Membrane waterproofing	2,490 cy.	.....	1,200 cy. 2.50	1,290 cy. 1.95	.....

Artists' Delineations Found Helpful

To the Editor, from R. H. Baldock, State Highway Engr., Salem, Ore:

"I was quite interested in your editorial with relation to artists' drawings. We started this practice ten years ago in the Oregon State Highway Department and have found that these artists' delineations not only help the man in the street to visualize the improvements but likewise are an aid to the engineer in checking not only the geometric design but also the esthetic features relating to the improvement. They are particularly advantageous in rather involved traffic interchanges.

"We have found through experience that, in the design of traffic-interchange structures, proper attention needs to be given the psychology of the driver and to make the correct movement an obvious movement to prevent the hesitation of a stranger in entering or leaving a traffic interchange to congest the flow of traffic and to cause hazard. As a consequence, even those who are accustomed to reading correctly the tracing depicting the geometric design of the traffic facility are helped to a great extent by these artists' delineations as well as by scale models.

"Their greatest aid, of course, is in selling the idea to the layman. They are reproduced in the newspapers and, in this manner, the idea reaches the mass of the people. We also display them in public buildings, banks and other places where people pass to and fro, and make them available for chambers of commerce and other civic groups whose committees are interested in road and street improvement. They serve to educate and inform the public."

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Editorial

WAR SURPLUS "BARGAINS"

HIghway and city officials who are licking their chops in anticipation of buying surplus army trucks at bargain prices will do well to think about replacement parts. A number of cities have had unsatisfactory experience with army trucks disposed of for one reason or another since the beginning of the war. As one city engineer put it, "You can't take 'em to your dealer and get parts."

Tons of parts are tied up in government warehouses, and someday most of these may be available. But having parts when you want them, or knowing where to put in a quick order, is what counts. Meanwhile, truck makers aren't going to worry too much about this problem. They'll be busy retooling for new models—with new parts lists.

The contractors we've talked to are less interested in loading up on surplus war equipment than highway and street departments. Contractors are more realistic in their cost keeping.

The latest and most efficient road building equipment, trucks included, was the only safe bet before the war. The rules of the game aren't going to change after things get going again, and road builders who stock up on ex-G.I. equipment had better leave a little money in the kitty for buying the new and better units manufacturers have on the boards.

ROAD PLOWS FOR AIRPORTS

RIght now many of us are thinking about coming winter and the snow removal job. We're also hearing of the big post-war growth in civil aviation that's sure to come.

Tying the two thoughts together, who should logically do the snow removal and other maintenance on commercial and municipal fields? Regardless of what administrative pattern is evolved, snow clearing at least can best be done by the people already equipped and experienced in this task—city, county

ing citizens, chambers of commerce, labor groups, motor clubs and other state groups.

In addition to Maine, these states have protected their highway funds: Minnesota, Kansas, Missouri, Colorado, California, Michigan, New Hampshire, Idaho, Nevada, North Dakota, South Dakota, Iowa, Oregon and West Virginia.

Maine has carried on the tradition that voters of no state will reject an amendment to protect their road

Abuse of Road Funds Prevented by Maine Amendment Vote

An avalanche of "yes" votes at the recent state elections placed Maine 15th in the list of states which have adopted constitutional amendments preventing diversion of motor revenues to non-highway purposes, according to an ARBA bulletin. The amendment, first approved by the state legislature, was sponsored by the Maine Good Roads Federation, lead-

and state highway departments. There may be exceptions in the case of the very largest air terminals. But for ordinary fields a tie-up with local road officials may save setting up costly duplicating organizations.

TAKE AN INVENTORY

AT the recent Public Works Congress a lot of time was spent on planning. The utterances ranged from gobbledegook to good horse sense. In the latter class was a couple of slants from Detroit's city engineer, George R. Thompson.

One was the importance of finally "getting out of research and down to live production on new models." He thinks gathering endless traffic surveys data is fine, but there comes a time to get down to cross-sections and tables of quantities.

Idea number two, and the more constructive one, is for perplexed and hesitant city officials to roll up their sleeves and simply take inventory of post-war needs. This can be done in short order. It is surprising how this simple act clears up hazy thinking on probable cost, location, character of project and priority of construction.

Detroit, by the way, has 10 million dollars worth of jobs designed and ready, and 81 millions more well on the way.

DON'T LET UP TIRE VIGIL!

TRUCK tires are everyone's big worry these days. The cold fact is, there are few left in our national stockpile and no prospect of quick relief, whatever happens in Europe.

So recheck your organization's tire-checking system. All drivers must be more watchful than ever. Special group meetings on tire care may be advisable.

Keep your truck speeds down. Go light on loads. Watch tire conditions. Recap early. You'll keep more trucks in the running.

funds and to insure steady progress in meeting the demands of traffic.

Diversion is still taking some \$200,000,000 annually away from road and street construction, largely in a dozen states, according to Charles M. Upham, of A.R.B.A., who points out that several states are making plans to get rid of the practice because of their urgent road needs. Advises from Nebraska and Washington foretell overwhelming adoption of similar amendments at the polls in November.

Snow Fighting Began in July

... in North Dakota, where weed and stubble control is important in minimizing drifts, and where equipment maintenance is an all-year job

THE North Dakota State Highway Department will enter the coming snow removal season with the same equipment that it had a year ago, with this exception—it is one year older.

Our four-wheel-drive trucks are all more than six years old, two of them having been purchased in 1928.

Our rear wheel drive trucks consist of 138 units, 78 of which were purchased prior to 1938.

We have one rotary purchased in 1941, and five purchased in 1936.

The War Department requisitioned two of our rotaries in 1942, and to date we have been unable to replace them. However, we have one ordered now and hope it will be delivered before winter sets in.

How about tires? Chains? Repairs? The answers to those questions will depend on the severity of the winter.

Our organization is using all the conservation methods it can, and with a little cooperation from the weather we will have a successful season. Usually snow conditions are bad only in one section of the state, and allow us to concentrate our forces in that direction. However, we occasionally have a state-wide blockade, as we did in March, 1943, and if that occurs we will be tied up for some time.

Our organization is getting smaller all the time. We have not lost many men to the armed forces, but many have succumbed to the lure of high wages in other fields. Good snow plow operators are the result of training and experience, and the lack of this training shows up in many ways. Wrecked trucks, burned out clutches, stripped gears, and poorly opened roads all add up against the inexperienced operator. We estimate that a

By GEORGE TESKEY

Assistant Maintenance Engineer,
N. Dakota State Highway Department, Bismarck

good truck driver needs a year's experience to make him a good snow plow driver.

Our program is simple, flexible, and will adjust itself to meet conditions. Each one of our divisions has a section of important highway that is a "must"—it comes first; then the other roads are taken in the order of their importance. If we get another storm before some of the minor highways are reached, the equipment goes back to the important highways and starts over again. If one division has more than it can handle, we transfer units from other divisions that are outside the storm area.

North Dakota's Problem is "Different"

We feel that very few states have a snow removal problem similar to ours. Snow in North Dakota seldom lies where it falls. It is piled into drifts by the wind, and the location of these drifts is more or less unpredictable. A burned stubble field or a piece of fall plowing will leave a sweep for the wind, and a road may be blocked in an entirely new location; on the other hand, a stand of sweet clover or a cornfield left standing may prove a very effective snow fence and a bad cut may stay open all winter. The drifts may be continuous for miles, or they may be miles apart, complicated by the temperature, for if the thermometer is colder than ten degrees below zero during the time the snow is drifting, the snow will pack so hard that stock can walk over the drifts and in some cases cars

can be driven over them. This is not a crust, but solid snow all the way to the bottom.

We early found that tractors were not ideally suited for our particular problem, as they took too much time traveling between drifts and merely piled the snow up along the shoulder. We believe that the ideal unit is one that can travel fast between drifts and hit the drifts with sufficient speed to scatter the snow. Leaving ridges along the shoulders is just asking for trouble; the next time the wind blows (which may be a matter of minutes) it will drift full between these ridges and eventually all the snow will be in the road and the fields bare.

Our first line of offense is a fleet of 1½-ton trucks with speed plows, which can handle drifts up to 2½ ft. if the drifts are not too long. When drifts are too large for this equipment, we go to the larger units. The heaviest of these are the 7 to 10 ton four-wheel-drive trucks, which are very satisfactory but in heavy going leave much piled-up snow. As soon as snow begins to pile up along the shoulders, the rotary plows are sent out to widen. Sometimes it is necessary to send along a motor patrol or a truck with a wing on it to pull the snow in where the rotary can reach it. We do not have enough rotaries to complete this job in all cases before the next storm hits, but usually the bad conditions are only in one portion of the state and we can concentrate our equipment there.

Try to Give Public Service

As soon as roads become blocked, all sorts of calls come in for relief. People are out of coal, out of food, or need medical service; someone has died



and the undertaker can't get out, etc. We always try to investigate these calls, and if the need is urgent we do everything in our power to bring help. However, we find that in many instances it is not a matter of life or death, but a matter of convenience and those cases must wait their turn.

The division engineers wire the Central Office each morning, giving the condition of roads in their division. This is condensed into a statewide report in this office, and given to the radio and press associations. We also cooperate with the weather bureau in giving notice of approaching storms.

We feel it is important to keep the public informed of the road conditions as a safety measure. To be stalled in a snowdrift is unpleasant at best; when it is miles from shelter, and during a storm, it is serious and a situation to be avoided at all costs.

The North Dakota blizzard is not to be trifled with, and he who ventures out in it had best be prepared for it. Many instances can be told of people who became stalled during a storm, left their cars, wandered around until exhausted, and then froze to death. The only safe thing to do in these cases is to stay in the car until the storm subsides, and not leave until daylight gives some indication of where to go and how to get there.

The man behind the telephone in the office has these things in the back of his head when he hesitates to say that the road is open.

Snow Program Begins in July

Our snow removal program begins in July, when we start moving. All weeds and vegetation along the shoulders, as well as that above grade and lying within the right of way limits, must be cut and disposed of. Anything on the right of way that will cause snow to drift must be removed, or protected by snow fence. We have over five hundred miles of snow fence that must be reconditioned and placed in strategic locations where it will catch the snow and prevent the formation of drifts on the road. This work must be directed by someone who is familiar with the road and knows the locations where drifts are likely to form.

Then the division engineer must make arrangements for certain men to report conditions to him immediately. The better organized this reporting is, the sooner equipment can be on the job. We find it best to have one man responsible for a definite stretch of road. We then disregard all other calls about this road until

(Continued on page 81)

Senate Passes Post-War Highway Bill

Authorizes \$450 million each of first 3 years following the War

THE U. S. Senate on Sept. 15 passed and sent to the House of Representatives an amended version of its postwar highway bill (S. 2105) which would:

1. Authorize \$450 million of Federal funds annually for each of the first three years following the war with \$200 million yearly for regular Federal-aid roads (urban and rural); \$125 million annually for urban highways and \$125 million annually for farm-to-market roads.

2. Require matching of 50% Federal funds on a 50-50 basis.

3. Allocate funds for regular Federal-aid roads on the historical formula of 1/3 area, 1/3 post road mileage and 1/3 total population; allocate urban funds in the ratio which the population of municipalities of 5,000 or more in any state bears to the total urban population of the nation; allocate funds for farm-to-mar-

ket roads on the basis of 1/3 area, 1/3 post road mileage and 1/3 rural population.

4. Eliminate proposals for use of Federal funds in purchasing land for rights-of-way.

5. Provide that at least 10% of all Federal road funds shall be used unmatched for elimination of rail-highway grade crossing hazards, with railroads paying 15% of the cost.

6. Provide a three-year total of \$140,250,000 for National forest and park roads and trails, not to be matched.

7. Provide that states not diverting highway funds shall receive Federal funds even if unable to match them.

In the House of Representatives the measure will meet the House committee-approved H.R. 4915 which proposes \$500 million annually in Federal-aid road funds for each of the first three postwar years.

Official estimate of annual apportionment of \$450 million for Federal-aid highways, farm-to-market roads and urban highways under the triple formula proposed in S. 2105

State	Federal-aid Highways	Farm-to-Market Highways	Urban Highways	Total
Alabama	\$4,187,000	\$3,109,000	\$1,310,000	\$8,606,000
Arizona	2,873,000	1,863,000	264,000	5,000,000
Arkansas	3,427,000	2,586,000	561,000	6,574,000
California	8,010,000	4,298,000	8,166,000	20,474,000
Colorado	3,593,000	2,287,000	939,000	6,799,000
Connecticut	1,241,000	639,000	1,985,000	3,865,000
Delaware	975,000	609,000	205,000	1,789,000
Florida	2,873,000	1,804,000	1,608,000	6,285,000
Georgia	5,020,000	3,591,000	1,631,000	10,242,000
Idaho	2,472,000	1,621,000	213,000	4,306,000
Illinois	7,874,000	3,974,000	9,562,000	21,410,000
Indiana	4,806,000	3,021,000	3,082,000	10,909,000
Iowa	4,962,000	3,325,000	1,601,000	9,888,000
Kansas	5,037,000	3,315,000	1,113,000	9,465,000
Kentucky	3,734,000	2,836,000	1,307,000	7,877,000
Louisiana	2,987,000	2,098,000	1,540,000	6,625,000
Maine	1,732,000	1,170,000	564,000	3,466,000
Maryland	1,628,000	976,000	1,800,000	4,404,000
Massachusetts	2,615,000	655,000	6,649,000	9,919,000
Michigan	6,076,000	3,446,000	5,713,000	15,235,000
Minnesota	5,381,000	3,475,000	2,218,000	11,070,000
Mississippi	3,591,000	2,778,000	603,000	6,970,000
Missouri	5,922,000	3,803,000	3,168,000	12,893,000
Montana	4,041,000	2,589,000	309,000	6,939,000
Nebraska	3,982,000	2,635,000	787,000	7,404,000
Nevada	2,551,000	1,602,000	61,000	4,214,000
New Hampshire	975,000	609,000	478,000	2,062,000
New Jersey	2,546,000	386,000	5,558,000	8,972,000
New Mexico	3,229,000	2,096,000	259,000	5,584,000
New York	9,636,000	3,563,000	18,878,000	32,077,000
North Carolina	4,822,000	3,706,000	1,501,000	10,029,000
North Dakota	2,982,000	2,014,000	216,000	5,212,000
Ohio	7,026,000	3,881,000	7,581,000	18,488,000
Oklahoma	4,517,000	3,109,000	1,356,000	8,982,000
Oregon	3,315,000	2,121,000	815,000	6,251,000
Pennsylvania	8,172,000	4,396,000	10,574,000	23,142,000
Rhode Island	975,000	609,000	1,129,000	2,713,000
South Carolina	2,709,000	2,098,000	658,000	5,465,000
South Dakota	3,139,000	2,095,000	223,000	5,457,000
Tennessee	4,237,000	3,056,000	1,602,000	8,895,000
Texas	12,666,000	8,364,000	4,488,000	25,518,000
Utah	2,250,000	1,405,000	436,000	4,091,000
Vermont	975,000	609,000	187,000	1,771,000
Virginia	3,656,000	2,659,000	1,499,000	7,814,000
Washington	3,148,000	1,998,000	1,475,000	6,621,000
West Virginia	2,196,000	1,732,000	812,000	4,740,000
Wisconsin	4,814,000	3,057,000	2,669,000	10,540,000
Wyoming	2,488,000	1,583,000	134,000	4,205,000
Hawaii	975,000	609,000	396,000	1,980,000
District of Columbia	975,000	609,000	1,153,000	2,737,000
Puerto Rico	987,000	944,000	839,000	2,770,000
Administration	5,000,000	3,125,000	3,125,000	11,250,000

HOW IT WAS DONE

Labor and time saving job kinks and interesting construction features, noted by R & S editors in their travels or sent in by readers. Send in your suggestions with sketches or snapshots.



Another Small Trailer

Recently we published a snapshot of a 2-ton trailer built from salvage materials by the Ohio highway department, Middletown district. Not to be outdone, the Cleveland district men under district engineer Robert E. Willems has come forward with a similar unit. The accompanying cut

doesn't show much detail, but the idea is there, free to any contractor or road or street department that has a lot of light toting to do. Salvage or "junk" assemblies like this are money savers now, but no doubt you'll be able to buy efficient factory-built units again one of these days without a priority.



frame and propeller shaft have been shortened to reduce the wheelbase to trailer length. The post consists of a piece of steel pipe, anchored in a steel cross-frame and decked out with a conventional lifting arm. A hoist line passes down the lifting arm to a drum unit with enclosed reduction gear, mounted over the rear wheels. This unit is operated by a power transmission system leading down under the frame, then forward to the outside of the truck's transmission housing, through which a special power take-off shaft has been attached.

One-Man Hoist Boosts Oil Drums

This mobile unit devised by the municipal garage men at Rochester, N. Y., enables one man to get 55-gal. oil drums onto a platform, where oil is then drained through pipes to dispensing tanks in the repair shop next floor below. The operator pushes the crane over to an upended drum, surrounds the drum with the semi-circular frame, tips the barrel and noodles it into horizontal position on the frame. Then the chain system shown is passed around the drum and fastened to the end of the plank, and the plank raised until the barrel rolls to the platform. Photo courtesy Frank Rowe, director, motor equipment division, Rochester, D. of P. W.



Another "War Baby" Crane

The shop men with Julius Porath & Son, general contractors, of Detroit, say this mobile derrick is the handiest thing they have for picking up heavy parts, towing service, etc. The truck is a standard chassis on which with

The whole shebang is made strictly from discarded or salvaged materials. When the war's over, modern factory-designed cranes will again be on the market, but meanwhile this unit is doing a good job according to Porath.



Heavy Strike-Off Towed Forward from Paver

The hand labor of spreading a stiff, dry paving mix is reduced and work of the mechanical finisher speeded by means of the heavy strike-off pictured. The contractor who devised it is the well-known Lane Const. Co. of Meriden, Conn., which we understand employs the device on all its pavers. The screed shown was photographed on the Martinsburg, W. Va., airport (CAA) last summer. It consists of a 6x12 inch timber dragged along the forms (12½-foot lane). At either end is a section of channel iron which acts as an apron to keep concrete from being wasted over the forms, and also as towing arms. From these arms cables lead to an I-beam arm projecting out over the subgrade from the paver, thence through small sheaves to a winch drum built into the paver mechanism.

Lane Const. Co. used this unit in conjunction with oscillating screed finishing machines of both transverse and longitudinal types.

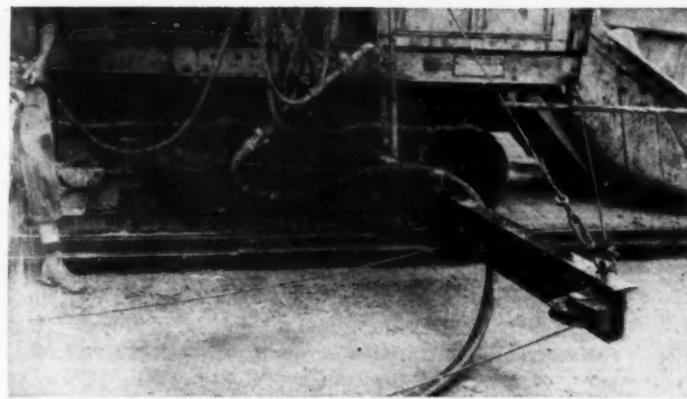
In practice two to six paver bucket-loads of concrete are spotted, then the screed drawn forward while one hand-shoveler watches against spill-

ing over the forms and fills occasional low spots to give the finisher an even surface to work on.

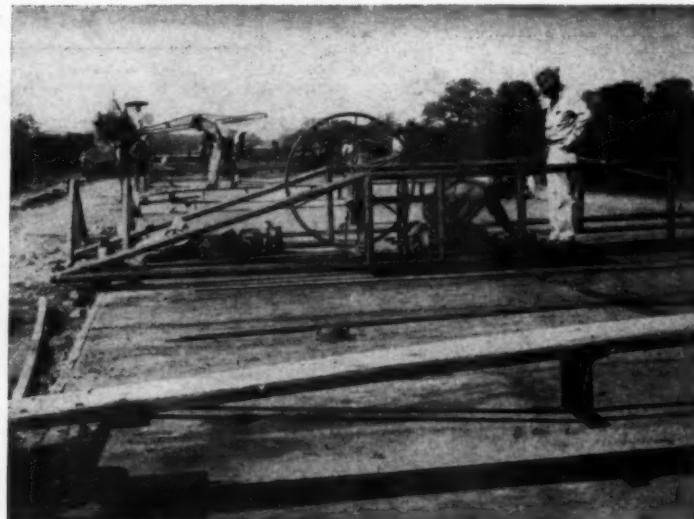
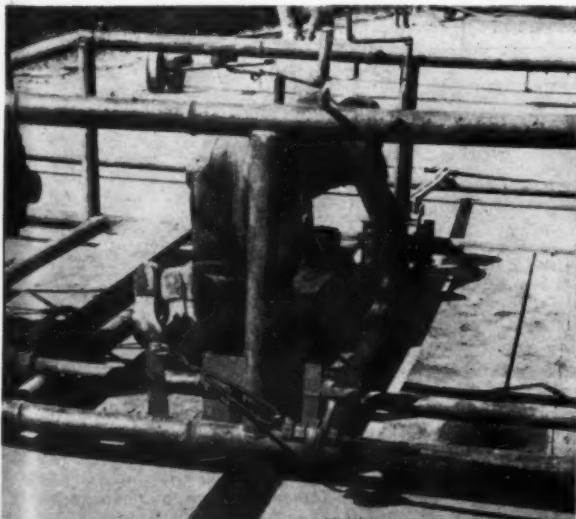
Traveling Bridge Helps Place Black Oxide Stripe

Another of the many "war baby" equipment items devised by the Austin Road Co. in Texas is the bridge shown, which enables one man to leave a perfectly made black center stripe of iron-oxide trowled into the concrete. This type of stripe application (patented) was employed experimentally by the Texas State highway department on Highway 183 between Ft. Worth and Dallas last May.

The machine—another "all junk" assembly—is simply a bridge which rides the forms and is moved along by turning the large hand wheel. Two parallel lengths of steel channel 6 in. apart rest flush with the finished pavement surface, forming a "trench" along which the concrete finisher sprinkles small quantities of oxide. The oxide is spread and worked in with a steel trowel and the edges of the stripe marked with an edger. Three lb. of oxide per 100 lin. ft. of stripe was used here.



Highway Research Board Meeting Postponed—The Executive Committee of the Highway Research Board has announced that owing to the exigencies due to the war it has been decided to postpone the twenty-fourth annual meeting of the board which had been scheduled to be held on Nov. 22 to 25 at the Netherland Plaza Hotel in Cincinnati, O. According to R. W. Crum, it is hoped that the meeting can be held early in 1945.



500 Attend Public Works Congress

Serious lag in blue-print job is chief concern at APWA's record-breaking 50th Anniversary meeting at St. Paul; topics included planning, advance engineering design, transportation, airports, snow removal, d. of p.w. organization, street maintenance, traffic control

FEW cities have really done a planning and blueprinting job for the post-war era, and a handful of the biggest cities account for most of the total projects reported, warned Fredrick R. Storrer, outgoing president, in his opening remarks at the American Public Works Association meeting at St. Paul, Oct. 24-27. Further quoting the association's planning committee he said that one-third of cities of 10,000 to 500,000, representing 18 million people, have not yet begun to plan.

Mr. Storrer told the gathering to remember that public works can only follow and supplement the work of business and industry; in the past, public works has accounted for about 5%, and all construction 15% of national production. Yet as a potent stabilizer public works projects must be ready to provide several million useful jobs, and possibly soon.

Col. Carey Summarizes True Status of Planning

Figures from the latest national survey of post-war public works planning progress were revealed by Col. Wm. N. Carey, Corps of Engineers, chief engineer, Federal Works agency. Highlights of these findings include the following totals as of July 1, 1944:

Plans completed—\$219,151,000 for federal-aid or other state highway projects; \$969,858,000 for all other public works in 9 classifications including urban and county roads and streets.

Survey and design stage—\$957,242,000 and \$1,648,513,000 in these categories respectively.

Preliminary stage—\$1,018,111,000 and \$3,395,704,000.

"Idea" stage—\$2,419,722,000 and \$6,297,387,000.

Col. Carey said that while the states have both funds and authorizations to plan, the plans ready or likely to be ready at present outlook represent only a few months' work. Over half of the blue printing is centered in five populous states. Most counties and small communities have done little or no planning.

Road planning presents a better picture than that of other public works, but is still cause for alarm. An elixir is needed. While not discounting the seriousness of engineer shortage and the uncertainty on legislation, Col. Carey struck out at the deplorable apathy on planning which he has seen in talking with local of-

ficials and engineers as well as the public. Public lassitude in turn is reflected in the hesitant attitude of Congress. "There is still room in public works for leaders who will lead," he said.

Planning Luncheon

At the Monday luncheon, E. J. Cleary of *Engineering News-Record* presiding, a 5-man panel took up phases of planning.

G. Donald Kennedy, v. pres., Automotive Safety Foundation, outlined latest developments in national legislation, giving special attention to S.2051, war mobilization and conversion act, which if signed, will represent a "turning point" in city aid, making federal funds for advance engineering directly available to cities as no-interest loans repayable later out of f.a. construction funds. S.2051 represents fulfillment of the program of the postwar committee of A.S.C.E.

No federal policy on city participation has been settled on, however. Congress is tax-minded and in a mood not to participate in cost of actual public works, advised Kennedy.

On highway legislation, Kennedy urged city leaders to interest themselves in the attitude of their congressmen, now back home. The House must approve the Senate bill recently passed, allocating 450 million dollars annually in federal aid for highways, of which 125 million is to be spent within cities in addition to 200 million on the f.a. system including urban.

Burton W. Marsh, director traffic engineering and safety, A.A.A., Washington, characterized transporta-

APWA Officers for 1944-45

President—Colonel Stuart M. Weaver, chief, Repairs and Utilities Branch, Military Const. Div., Corps of Engineers, Washington, D. C., succeeding Frederick R. Storrer, Dearborn, Mich.

Vice Presidents—Captain Samuel S. Baxter, Corps of Engineers, New York City; Lloyd M. Johnson, Commissioner of Streets and Electricity, Chicago; J. W. Morgan, Dir. of Public Works, Birmingham, Ala.; Walter N. Frickstad, City Engineer, Oakland, Calif.

Treasurer—Albert P. Learned, Black & Veatch, Consulting Engrs., Kansas City, Mo.



1945 A.P.W.A. leaders: Chas. L. Wartelle (city engr., Seattle, Wash.); Albert P. Learned (Black & Veatch, Kansas City, Mo.), treas.; E. A. Fisher (city engr., Lakewood, Ohio); Lloyd M. Johnson (commissioner of streets and electricity, Chicago), vice-pres. of Central Area; Col. Stuart M. Weaver (Corps of Engrs., Washington, D. C.), pres.; Frederick R. Storrer (city engr., Dearborn, Mich.).

retiring pres.; Capt. Samuel S. Baxter (Corps of Engrs., Philadelphia, Pa.), vice-pres. of Eastern Area; Wm. A. Xanten (supt. city refuse div., Washington, D. C.); Wm. Sydow (dir. public service, Miami, Fla.). Not shown in this picture are: Walter N. Frickstad (city engr., Oakland, Calif.); J. W. Morgan (commissioner public improvements, Birmingham, Ala.)

tion as a city's "biggest business," calling for fullest use of engineering techniques in studying and solving parking and other problems. The Syracuse (N. Y.) plan was praised for integrating traffic planning with that of housing.

George R. Thompson, city engineer, Detroit, declared that cities must "get out of research and down to line production on new models." Bold imagination in early stages of planning has paid in Detroit, where Mayor Jeffries in 1941 in ordering planning said, "Forget the money." Detroit's present p-w. program is both bold and well advanced. It calls for 271 millions in capital improvements and 56 millions in a supplementary program of rehabilitation (street repairs, etc.)

"Good engineers are still our bottleneck," said Thompson, "but there is a big need to clear up hazy thinking on city programs, which often can best be done by making an inventory of needs. Such an inventory, in the mere act of preparation, narrows down uncertainties on cost, location and character of project."

Detroit has 10 million in projects ready for bids, 81 million on the boards. Thompson praised Detroit's decision to vest future designing in a separate department, located away from other city engineering offices but tying in. About 2% of project cost has been required for design. To meet help shortage, fullest use is made of standard design and specification sheets, the latter merely being assembled under a check list for a given project.

G. H. Herrold, planning engineer, St. Paul, Minn., spoke on the vital relationship that must exist between citizen committees and planning. Planning mustn't become a hobby, a hobby being defined as "something you go goofy over to keep from going nuts." Leadership must be found. City charters are usually explicit on budget and immediate procedure but silent on how a council can lay out a long-term program. The citizen's committee, hence, is needed to assure essential continuity.

St. Paul's Planning Board, which is such a committee, has concentrated on three major projects: a new civic center, a recreational program, and a transportation study including trucking ordinance. This is not a spending but a need program. Since 1920 St. Paul has put \$46,000,000 or 2 million a year (capital only) into streets and the post-war pace will be about the same.

Herman E. Olson, city planning engineer, Minneapolis, provoked thought with two points.

1. The business interest of a community must come first in public



Snapped at the Advance Engineering panel luncheon. Speakers, l. to r.: Geo. R. Thompson (Detroit), Burton W. Marsh (AAA, Washington, D. C.), G. Donald Kennedy (Automotive Safety FD), E. J. Cleary, Ch. (Engineering News-Record), Geo. H. Herrold (St. Paul), Herman E. Olson (Minneapolis)

works planning. Business stimulation through wise city development creates more jobs. Tax conscious people will look askance at programs aimed merely to create construction employment. Minneapolis plans are watched by a business-interested Committee for Economic Development.

2. Since post-war prosperity must depend on a business and industrial conversion which takes place primarily in cities, the nation's attention must be focused on improving the physical condition of cities.

Panel on Advance Engineering Design

With Capt. Samuel S. Baxter, Corps of Engineers, presiding, the Monday p.m. session was devoted to post-war engineering.

Michael Baker, Jr., civil engineer, Rochester, Pa., panel chairman, described the ventilation and other features of a large tunnel to be built on the Penn-Lincoln parkway in Pittsburgh, as an example of the complexity of future projects. He also praised the Pennsylvania state highway department for its decision to speed advance planning by engaging outside engineering help.

William E. Baldry, city engineer, Topeka, Kans., discussed probable departures in future engineering design. Speaking for the Kansas region, he foresaw larger airports but only for the few largest cities. Under Topeka's plan 76 street improvements will constitute 23% of post-war betterments outlined. A complete table of working drawings is ready. Order of construction is withheld to the public to avoid pressure groups.

After the war cities must do something about poor engineering salaries, which frequently will be lower than the military pay of men who hope to come back to their old jobs, said Baldry.

E. A. Fisher, city engineer, Lakewood, Ohio, held up the Cleveland Freeways as an example of major projects well along in spite of wartime difficulties.

Mark B. Owen, dir. research and development div., A.S.C.E., summarized his society's activities, saying that their goal is to see 15 billions in construction ready by July 1, 1945, of which $\frac{1}{2}$ is public works. As of this Sept. 1, he reported, the value of p.w. plans in the design stage had reached 7.7 billions, but these projects were very poorly distributed and weak in small projects. They are classed as follows:

Streets and roads	.....	\$903,000,000
Bridges	.....	365,000,000
Water works	.....	258,000,000
Sewerage	.....	456,000,000
Public buildings	.....	677,000,000
Earthworks	.....	123,000,000
Others	.....	435,000,000

"Have Simple Money Program; Hold to It"

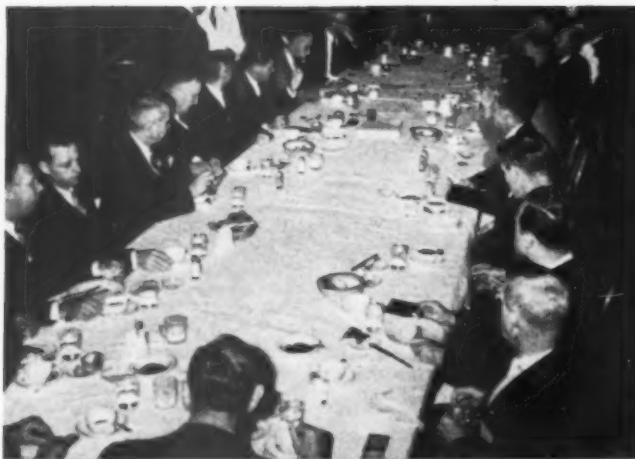
This is the admonition of Carl H. Chatters, exec. director, Municipal Finance Officers' Assn., Chicago. He said every city should live up to a definite financial policy and program. Otherwise the greater the post-war public works program, the greater the financial damage.

He urged a tax policy that will encourage building homes inside cities instead of out. Housing trends in turn will deeply influence street, sewer and other project planning.

Tuesday Transportation Forum

Col. Stuart M. Weaver, Corps of Engineers, presided over the transportation session. Chief of Engineers, Maj. General Eugene Reybold, reviewed federal waterway development and the 4.5 billion dollar shelf of river and harbor improvements ahead. R. S. Henry, Assn. of American Railroads, spoke for railroads.

Jack Frost, National Aeronautic Association, Washington, gave a stimulating paper on airport trends. Compared to 130 million passenger-miles flown by U. S. airlines planes at home and abroad in 1932, commercial traffic rose to 1.3 billion passenger-miles in 1940, is headed toward 29 billion in 1946 and 33 billion in 1951. Six to 7 hour coast-to-coast schedules, inclusion of every city over 10,000, and the existence of hundreds of thousands of war-trained pilots and air techni-



Snow removal and airport breakfast round tables at the APW convention

cians are among the factors assuring aviation a place to be reckoned with by city and highway planners. Air fields should be planned to serve five major functions: aid growth of air transport and private flying; encourage wider ownership of private airplanes; serve national defense; tie in with a revolution in recreational habits (1,000 mile week-ends); give employment. Several standards of airfield design should be kept in mind (representing an upping of present Class 2, 3, 4 and 5 CAA fields):

1. The "air park," with minimum runways of 300x1800 ft., not necessarily paved; 20 to 1 glide angle; several such parks in larger cities.

2. Runways 3000 to 4500 ft. long for feeder lines, serving 2-motor 20 passenger planes.

3. Six thousand foot runways for middle-class fields, to serve 30-70 passenger ships.

4. And 10,000-ft. runways for largest terminals, to serve 75-ton planes.

Incorporated airport districts are the big urgent need, said Frost, as a basis of planning and to avoid duplication. He cited Kentucky's as one of 4 state laws authorizing such districts. Airport authorities must be set up as government corporations empowered to acquire property by condemnation and to carry out financing.

H. S. Fairbank, deputy commr., Public Roads Administration, Washington, said that while highway trucking has held steadily at pre-war level of about 46 billion ton-miles annually, passenger vehicle traffic on rural highways has fallen from 135 billion car-miles in '41 to 75 billion in '44.

On the staggering war-deferred highway and street need, he noted that street and highway expenditures have fallen during the war from the \$2,040,000,000 peace-year average (\$1,430,000 construction, \$610,000,000 maintenance) to \$780,000,000 annually

in the three war years. Of this \$360,000,000 has been for construction, or only one-fourth normal, and \$420,000,000 for maintenance, or two-thirds "normal."

Putting it another way, at \$3,210,000,000 3-year lag in construction and \$570,000,000 lag in maintenance must be made up in the form of early construction or else highway service will be seriously affected, said Mr. Fairbank. In 1945 we need to spend \$2,500,000,000 for road construction and \$700,000,000 for maintenance just to get back to a pre-war level of effort. Such a volume would employ an estimated 865,000 on-site and 1,265,000 off-job workers.

Mr. Fairbank pointed out that 41% of the public works projects "completely planned" to date, as compiled in the recent FWA report, are highway and street projects, (state, urban and local) representing \$487,000,000. Of projects in the active design stage, 53% or \$2,706,000, are streets and highways, while in the preliminary or idea stage, street and highway projects make up nearly half of a 13.5 billion dollar list.

Further summarizing, \$2,689,000,000 in urban highway and bridge projects are in various planning stages, \$530,000,000 being ready or under design, according to reports from 593 cities. But, 83% of these are in cities of over 100,000 population. Cities reporting over 500 millions in traffic projects have funds or arrangements for only 80 millions.

Mr. Fairbank urged greater consideration of long range goals in engineering design, pointing to the long-time thinking which has resulted in progress in the past quarter century. The proposed standards set up for Interregional highways represent the conception of a long period of refining development of our existing primary highway system, rather than the sudden superimposing of radical changes. He plead for a wider accord on de-

sign proposals, pointing to the recent wide dissent on the questions of limited-access and basis for future traffic growth. "Limited access" should not be a rigid term but one to be interpreted by states as needed, under laws giving the state highway department necessary discretion.

Sound post-war highway development requires wide recognition of two ideas:

1. The need for proper legal powers and administrative means to cope with recognized new needs; and

2. Allowance in early planning for changes certain to be due to meet future traffic growth.

Breakfast Round Tables Covered Many Topics

The airport and highways round table was led by C. A. Walls, assoc. airways engineer, CAA, Chicago. Airports was the almost exclusive topic. Mr. Walls drew from a report of the APWA airport committee, which gave several timely conclusions. Geo. H. Shepard, (chief engineer, St. Paul), chairman of this committee, stressed the serious municipal problem of heavy airport costs, and pointed to the Minneapolis-St. Paul Airports Commission which was characterized as an ideal metropolitan body. Highlighted was the need for setting up big-city airports on an area basis elsewhere and early passage of laws creating permanent aviation authorities. A resolution favored federal airport aid under present CAA recommended conditions with continued municipal control.

The motor equipment breakfast, under C. W. Barnhouse, president, the Elgin Corp., was devoted to surplus war equipment. Several cities which have recently purchased military trucks and other "non-standard" war equipment at bargain prices have already run into a serious parts problem. Others are finding that war

(Continued on page 111)



A fine looking section of road after "skid-proof" treatment with rock asphalt

Ohio Roads "Skid-Proofed" with Thin Rock Asphalt Treatment

WHAT should be done about bituminous surfaces that have developed fat spots, worn too smooth on hills and turns, or otherwise showing a need for skid-proofing?

This question has engaged the attention of maintenance men in the Ohio Department of Highways for some time. One method was to simply scatter plant-heated aggregates and roll. Another of the practices was to burn off smooth areas with straw and coal oil, then add fresh aggregate in a thin layer and roll it in. One state division has employed a surface heater, consisting of a battery of blow torches, which was passed along to melt on freshly applied aggregate.

Now Use Emulsion Plus Rock Asphalt

The method being employed cur-

rently with the best success to date, like that last-mentioned method, does not take anything away from the old road, but rather adds a "sand-paper" course. A light asphalt emulsion is fogged on at the rate of 1/15 to 1/20 gal. per sq. yd. and followed with two courses of rock asphalt, each 3 to 4 lb. per sq. yd., totaling $\frac{1}{8}$ to $\frac{1}{4}$ in. thickness. Each course is applied from the truck with a mechanical spinner, then dragged over once and back with a light drag, moving at 15 m.p.h. for best results. The drag consists merely of a piece of guard rail mesh cleated to a 2x4 timber frame. This method has been used successfully in Kentucky for 6 or 7 years, indicating at least that many

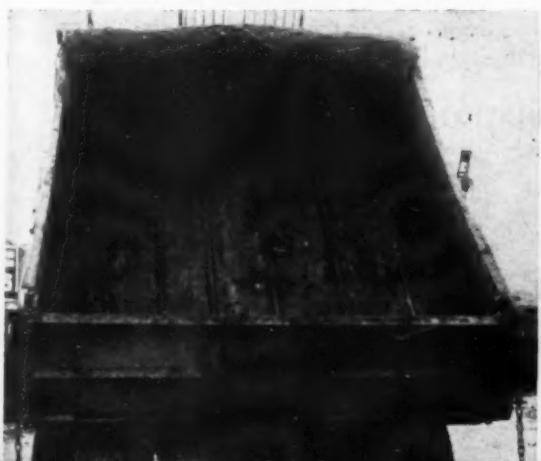
years of service life for the treatment when properly applied.

A different compaction method is being tried out this year. Instead of leaving compaction to traffic, a light pneumatic tired roller is employed with varying weights in its sand box. The rock asphalt is applied hot, being heated by means of steam pipes in the truck bed after unloading by clamshell from car to trucks. A three-ton truck load can be heated to 200° F., the temperature desired, in about 15 minutes.

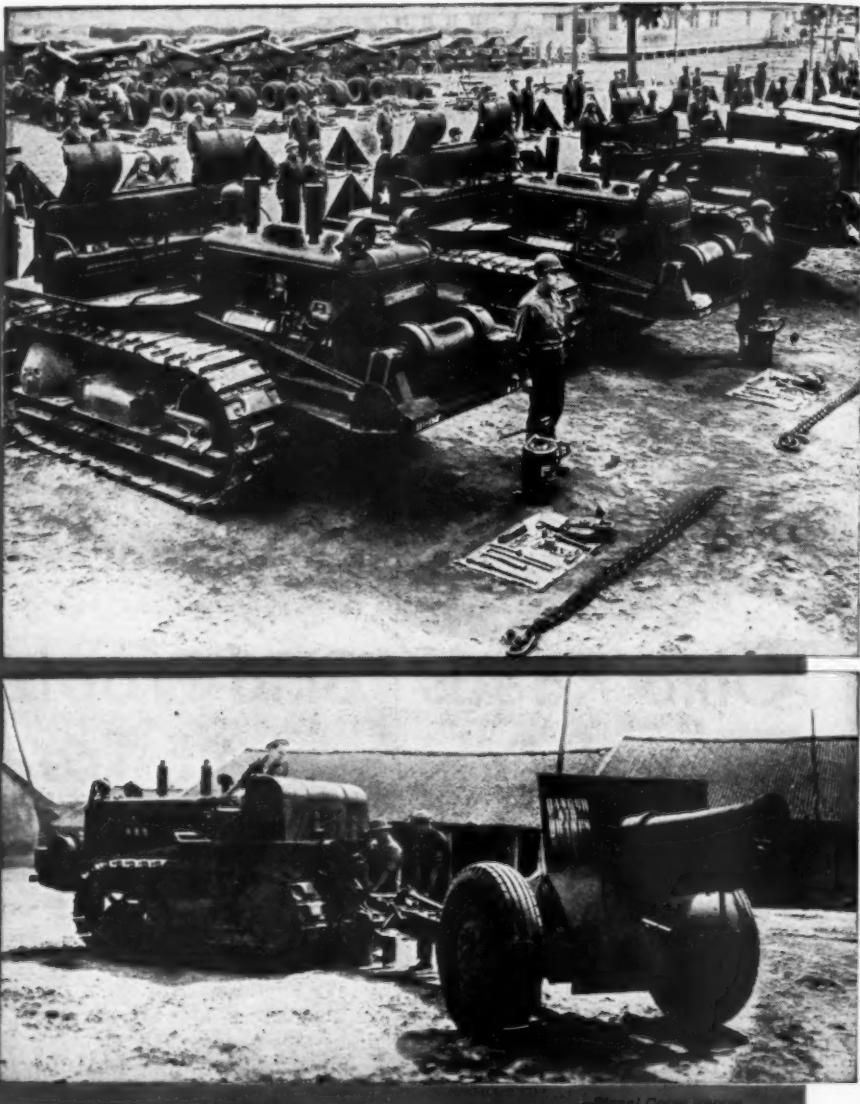
Application Not Continuous

A 15-mile section on State Route 126 in Hamilton County (near Cincinnati), Ohio, has been treated its entire length, however, this skid-proofing ordinarily is not applied continuously but only where needed. Sections so treated may vary from a few

On this job rock asphalt is loaded from cars into truck beds in which were installed six parallel perforated steam pipes. Loaded trucks drew up alongside a boiler and a steam hose fitted to a riser leading up through the material to "X." About 2 minutes required to heat the batch to 200° F.



**INSPECTION
LINE—
or
FIRING
LINE—**



—Signal Corps Photo

"Good Soldiers," These Internationals— Wherever You Find Them

INSPECTION LINE or firing line . . . it makes no difference to these big International Diesel TracTracTors. They are ready whenever or wherever duty calls.

They're "good soldiers" at training camps and battlefronts, on maneuvers or under fire overseas. They're winning praises from GI's and Generals alike. They pave the way for airpower, footpower and firepower . . . *All honor to the men who drive them!*

While these tractors are fighting on the battlefront, it's up to all tractor operators to conserve equip-

ment here on the home front. *Make it last!* Harvester and the International Industrial Power Distributors stand ready to see you through.

And in the meantime, let's all remember that it's up to all of us to fight harder on the home front . . . fight on the food front—give to the blood bank—buy extra War Bonds—fight inflation. **FOR VICTORY.**

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue
Chicago 1, Illinois

INTERNATIONAL HARVESTER
Power for Victory... Power for Peace

feet to 500 ft. or more in length. In this way a bituminous road which is otherwise in good physical condition, but getting skiddy and slippery, can be given good traction characteristics at about 6c per sq. yd., the cost for actual area treated. The first sections treated in this manner have shown continued good results for more than a year. It is an excellent means of utilizing rock asphalt's admittedly excellent characteristics as a surface material at low cost. The effectiveness of the treatment is shown by the abrupt cessation of guard rail crashes at hills and turns along certain routes treated. It has almost paid for itself in some instances in cost of guard rail repairs saved.

One word of caution: July and August are the best months for this treatment in Ohio or corresponding climate. Warm weather is essential.

The force account crew usually comprises one clamshell operator at the siding, 1 water man, 1 on car clean-up, 3 truck drivers (short-haul minimum), 3 men on back end of spreader, 1 on the drag.

On one typical project where 1/30 gal. emulsion and 5.85 lb. of rock asphalt was applied per sq. yd., labor accounted for 24% of the total cost of \$686 for a 20-ft. wide coverage and \$618 for 18-ft. width. Equipment rental was 11%, materials 65%, figuring rock asphalt at \$11.00 per ton f.o.b. cars in Cincinnati area and asphalt emulsion at 8 1/2 cents a gallon. Subsequent projects have been built at lower costs as the work became better organized, and the figure of \$100 per mile per pound of application 18-ft. wide is used in estimating. Work was speeded up, until a 60-ton carload or 40,000 sq. yd. of 3-lb. application was placed in two days.

Maintenance crews in the various State divisions have been made acquainted with the skid-proofing procedure with the help of demonstrations and a short movie.

The method described herein is being continued in Ohio this year on an extended scale.

1. Spreading the second application of rock asphalt, using a sand spinner
2. Wheels of sand spinner were built up with welded "beads" as shown so that wheels would mark only a narrow path of disturbance through the freshly placed material
3. Dragging is best done at about 15 mph. The drag shown here consists of a piece of discarded wire guard fence cleated to 2x4's at each end. Wears out soon, but in spite of frequent need of replacement, an economical and effective drag for this work
4. Rock asphalt is compacted by some means other than traffic. A lightly loaded, truck-drawn pneumatic roller is recommended





CLETRAC
*Tru-Traction**

is a dividend payer

ON any job of scraping, bulldozing, hauling, logging, where going is tough and competition is keen, you'll find Cletrac Tru-Traction power a dividend payer.

With Cletrac the pull of one track is balanced against the pull of the other. The work demanded of each track is divided. When turning a Cletrac, the speed and pull of one track is equalized and coordinated so that both tracks always pull—one traveling faster than the other. The action and speed of each track is under positive mechanical control of the operator at all times.

Unless you understand thoroughly the Cletrac

With Tru-Traction CLETRACS:

Move smoothly around curves.
Consume less power in turning.
Steer the same downhill as on the level.
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Stop and hold larger loads on hills.
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Power is never disconnected.

Tru-Traction principle—Controlled Differential Steering—patented and used exclusively for years by Cletrac, you cannot wisely judge the value of any tractor. An easily understood book—Cletrac Controlled Differential Steering—explains Cletrac Tru-Traction in detail. Send for a copy and study it thoroughly before you purchase your next tractor.

*Tru-Traction is power on both tracks at all times

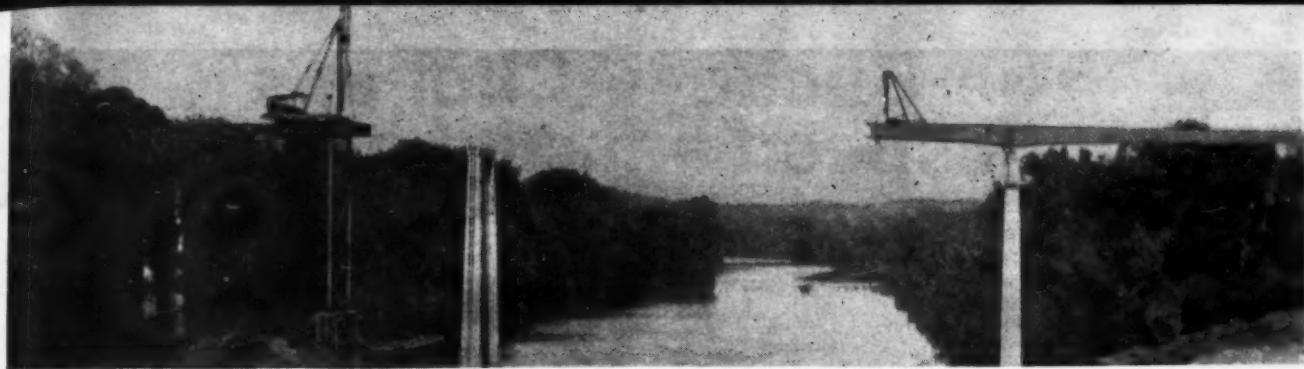
THE CLEVELAND TRACTOR COMPANY • CLEVELAND 17, OHIO



CLETRAC Tru-Traction TRACTORS

GASOLINE OR DIESEL





Showing false bent for supporting first section of girders, as used on river spans each side of center span

High-Level Bridge in Alabama

Cranes, guyed derrick and traveler set girders on \$750,000 project representing latest design practice

ONE of the most important recent highway bridge projects in Alabama is the new high-level bridge over the Warrior River on U. S. 11, 8½ miles South of Tuscaloosa, Alabama. In addition to this structure Project SN FAR 150-A(2) to A(4) includes two relief bridges, grading and concrete paving of four miles of approach road, and eventual removal of the old bridge after the new roadway was opened to traffic.

The river bridge, 1,330' 1" long consists of 12 spans beginning at the North end as follows:

88' 3"	140' 8½"
86' 9½"	210'
86' 9½"	140' 8½"
86' 9½"	105' 9½"
86'	105'
86' 9½"	107' 3"

Understructure Design

There are eleven piers and two abutments. Beginning at the North end, piers No. 1 to 5 inclusive are on steel foundation piles and consist of two concrete columns with concrete tie beam and cap. All other piers rest on blue marl, with solid web walls from about ground surface or low water level, as the case may be, to bottom of caps. Piers No. 7 and 8 are river piers 124 ft. and 130 ft. in height respectively, from bottom of foundation to top of caps. Seal concrete was used for these two piers, totaling 1,040 cu. yd.

The two abutments each consisted of 12 10-in. steel H-Beam piles with concrete caps and headers. The earth embankment completely envelopes the piles. Grouted rip-rap was placed along the embankment at the North end where there will be considerable current during extreme high water.

Superstructure Reflects Alabama Practice

The deck consists of four steel plate girders carrying a 24-ft. 7-in.-thick

By S. J. CUMMING

Division Engineer
Alabama Highway Dept., Tuscaloosa

concrete roadway slab, with a curb 11-in. high and 18 in. wide at either side. The hand-rail posts, 12x12 in. x 21 in. high, rest on cantilevered brackets outside the curbs. The single 8x11 in. concrete rail between posts is cast integral with posts.

The deck is in four sections, with expansion joints over piers 3, 6, and 9.

Press Built from Steel Towers

The piers were constructed with the aid of a steel tower from which the forms, reinforcing steel and concrete were handled from the ground. A barge was used for handling equipment and materials for the river piers.

The plate girders were fabricated in sections at the Birmingham plant of the Virginia Bridge Company. They were shipped by rail from the plant 14 miles to Birmingham where they were loaded on barges and taken down stream to the site. Tracks were built from the water's edge to each end of the bridge on which trolley cars were used with a gasoline hoisting engine for distributing the girders along the ground under the bridge. Girders for spans 1, 2, 3, 4, 5, 6, and 7 were placed from the ground with a 35-ton crawler crane. Girders for span 11 were placed with a guyed derrick erected in the cut at the South end of the bridge at bridge floor level.

Girders on all other spans were placed by traveller derricks moved forward on top of the girders as each section was placed.

In spans 7 and 9 temporary timber pile foundations were driven for sup-

porting a steel false bent which bent supported the ends of one section of the girders. The last section of girders to be placed was 105 ft. in length in the middle of the main river span. The girders for this section were raised with the traveller cranes landed on the girders in place at each end of this 105-ft. section and the girders were raised from the barges anchored in the river immediately under the section.

Final connection was made by waiting until the temperature had expanded the girders in place to where the girders for the last section slipped into place and were bolted up with only a slight amount of packing for two girders.

Contract Details

The contractors responsible for the completed project are:

Forcum and James Company of Dyersburg, Tennessee, for construction of piers, quantities as follows:

Bridge Excavation	5,993 cu. yd.
Seal Concrete	1,040 cu. yd.
Footing Concrete	623 cu. yd.
Pier Concrete	1,884 cu. yd.
Reinforcing Steel	307,371 lb.
Structural Steel	3,134 lb.
Steel Test Piles	4
Steel Piling Furnished and Driven	7,985 lin. ft.
Total Amount of Contract	\$149,452

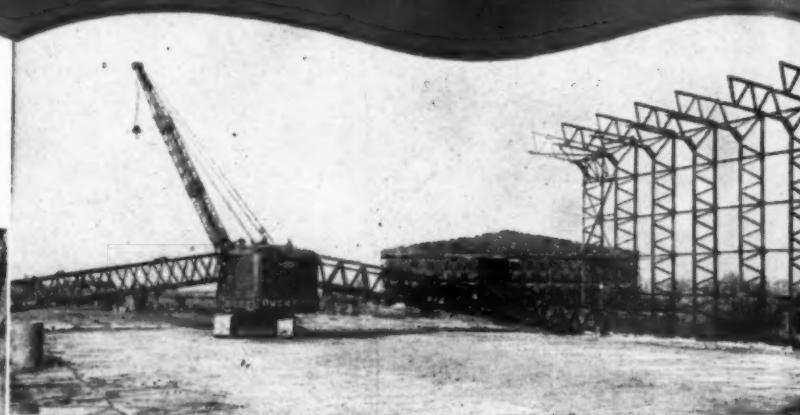
The second contract, SN FAP 150-A(3), consisted of two relief bridges let jointly with the first contract to Forcum and James for \$32,345. The items included:

Steel Test Piles	4
Steel Piling Furnished and Driven	6,488 lin. ft.
Steel Pile Cut-Offs	45 lin. ft.
Bridge Concrete	660 cu. yd.
Reinforcing Steel	138,295 lb.

These relief bridges consisted of steel pile bents of four piles each, with a concrete cap integral with the concrete floor slab. The spans were 16 ft. center to center.

Abutments of relief bridges consisted of 7 piles in main wall and 45° wings with concrete wall reaching down to

The Buckeye Clipper's smooth speed amazed our Allies!



ABOVE: Buckeye Clipper Crane erecting steel framework for hangar at Benoa, British Combié photo.

LEFT: Clipper Crane at Miln Bay, New Guinea. U. S. Army Signal Corps photo.

American-made power shovels and cranes have been shipped to all parts of the world. Prior to the war, Buckeye was so busy supplying domestic users that few Clippers were shipped abroad. Since the war, however, practically our entire output has gone to battle-fronts around the world. For the first time, many Australians, Russians, Free French, British and others of our Allies have seen how Mevac Vacuum Power Control simplifies power shovel and crane operation.

Reports indicate that they are amazed at the way Buckeye Clippers handle — fast,

smooth, positive action that minimizes wear and tear, reducing the need for maintenance. Six small handles operate the vacuum cylinders which control all operations.

Clippers have all of the features of sound engineering design that you expect to find in a modern shovel *plus* exclusive Mevac Vacuum Power Control. They have an enviable war record. A Clipper on your peacetime jobs will insure maximum profits; minimize maintenance costs. Send for a copy of "The Age of Clippers."

BUCKEYE TRACTION DITCHER CO.

Findlay, Ohio

Built by Buckeye

Convertible Shovels Road Wideners Trenchers
Excavators P-Rippers Scrapers Traction Equipment



General view of bridge looking south

about ground level. Grouted rip-rap was placed from 3 ft. under ground line to 2 ft. above high water on the side slopes beyond the ends of the wings and extending around the abutments. In front of the wings and abutment walls the rip-rap came up only about 3-ft. above the bottom of the walls.

The third contract for the furnishing and placing of steel superstructure was awarded to the Virginia Bridge Company of Roanoke, Va., for \$172,800.

Contract for the concrete floor slab, hand-rail and lighting system, to Milam Construction Company of Birmingham for \$58,043. It involved 1,145 lb. concrete and 262,000 lb. reinforcing, also lighting system complete and painting structural steel, superstructure, etc.

Contract for grading about four miles of roadway approaches, to R. T. Smith of Atlanta, Ga., for \$188,673 and included clearing and grubbing, the construction of small drainage culverts, and placing of subgrade topping, loamy top soil and grassing.

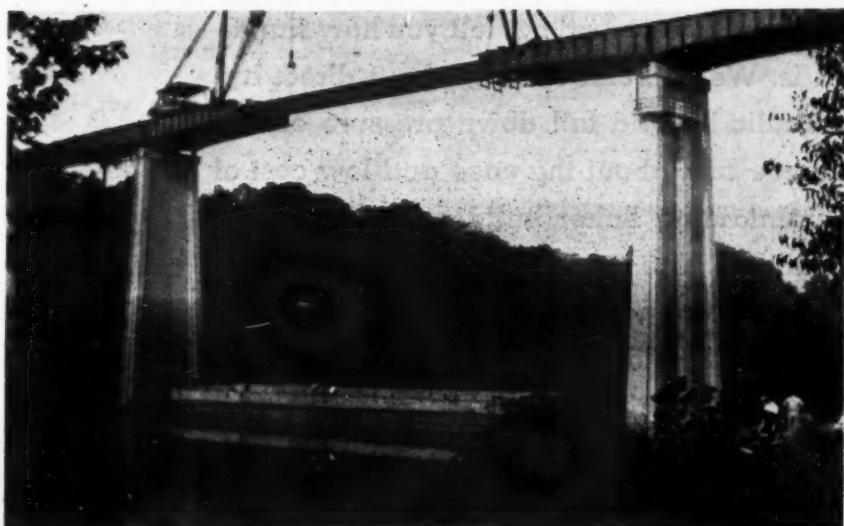
Contract for removal of structures from the right-of-way, to B. B. Etheridge of Gannett, Ala., for \$2,647.

Contract for concrete paving four miles of roadway approaches, to Weymouth Construction Company of Memphis for \$139,402.

Contract for the removal of the old bridge has not yet been awarded.

The bridge was designed by the Alabama state highway department's bridge department in the general office at Montgomery.

Construction was supervised by the Third Division office, at Tuscaloosa. Rex Sikes was Project Engineer on the substructure until he joined the Engineer Corps, U. S. Army, being succeeded by J. J. Helton, now employed by T. V. A., and he by S. H. Park, who served as Project Engineer



High level bridge nearing completion over Warrior River near Tuscaloosa, Ala.

on the steel superstructure and concrete deck and will be Project Engineer on the concrete paving. W. G. Little was Project Engineer on the roadway grading.

Since this was an F. A. job, periodic inspections were made from the Alabama Office of PRA under E. U. Stevenson and PRA's bridge department under E. L. Erikson.

New bridge, seen from south end during deck construction



Ever Operate a BAKER

If you did, we need not tell you how simple it is. We've been talking about direct hydraulic lift and full down pressure on the blade and about the ease and low cost of maintaining Baker bulldozers and grade-builders. But, as a contractor who operates five Bakers pointed out to George Phares, our No. 1 field man—"Baker's ease of control is something to write home about."

Operator faces forward—no need to sit askew. Control lever is within convenient reach. Four lever positions—float, down, hold, raise. Fast, positive action. That hold is important—you can put the blade in a cut and hold it there! On many occasions, especially where the going is tough, hydraulic down pressure is the operator's "ace in the hole."

Baker Bulldozers on Allis-Chalmers
2-cycle diesel tractors are making it easier for our fighting forces on every front.

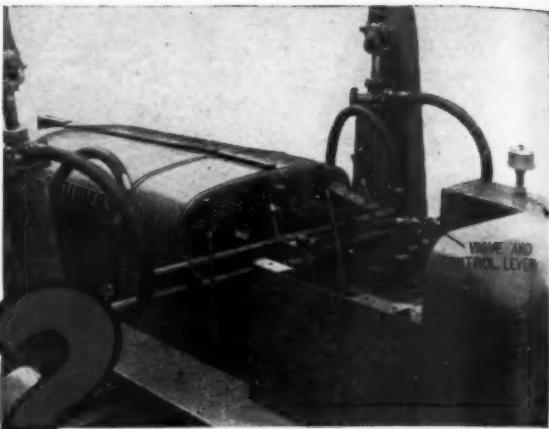
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"If it concerns Victory, it concerns us!"

BULLDOZERS SNOW PLOWS

BAKER



FEATHER TOUCH
PALM-FIT
CONTROL
LEVER



Top: Baker Bulldozer on Allis-Chalmers tractor clears floor of pit for buried fuel tank in South Pacific.

Bottom: Private Wally Saner, former Baker employee, removing snow at Alaska air base with Baker Gradebuilder which helped build base.



CONSTRUCTION EQUIPMENT

Engineers' Part in European Invasion

Victorious armies make headlines—leaders become heroes—flames of hope rise and fall as the tides of battle ebb and flow . . . and yet . . . the biggest job of all—GETTING READY TO FIGHT—is lost to view and fed into the maws of an insatiable hamburger machine. The spectacle of planes blotting out the sun and an avalanche of men and steel rolling toward Berlin obscure the vast preparations that MUST precede them.

The following stirring summary is based on an interview with Lt. Col. Shelby A. McMillion, Chief, Liaison Section, Intelligence Division, Office of the Chief Engineer, European Theater of Operations.

THE Corps of Engineers has had a prominent part to play in every war since the Revolution. However, the need for great mobility in this war has made the engineer mission even more important. A single front-line division and its supporting troops require more than a thousand tons of supplies a day, and there are three times as many vehicles per hundred men in our present army than during the last war.

The engineers with their vast capacity for construction and earth moving are able to build roads, railroads, airfields and bridges more quickly than any other army in the world. It is this construction speed, made possible through mechanical genius of American industry, that enables the American armies to move quickly, to be able to drive ahead relentlessly with no concern about supplies and communications in the rear. This is the decisive weapon in the hands of our American armies—the prodigious work-power of the American engineers who can maintain communications regardless of whether

our armies advance five or fifty miles a day.

Before the Invasion

Major General C. R. Moore, Chief Engineer, European Theater of Operations, was responsible for all construction and acquisition of property needed to maintain the U. S. invasion forces in the United Kingdom. This job began two years before the invasion and involved the construction and acquisition of more than 100,000 buildings in 1100 different English towns and villages. The U. S. Army Air Force alone required roadways, perimeter tracks and hard standings equal to a 20-ft.-wide concrete highway from New York to Moscow. Fortunately, our British allies provided all the materials and a large part of the labor for this job.

Prior to the invasion over 12,000 maps had to be made by engineers, since no maps, suitable for military operations, had been made of northwestern Europe since the days of Napoleon. These maps, using special precision equipment developed by the engineers for accurate map computation and aerial photographs, were of such accuracy that unobserved artillery fire could be used 24 hours a day.

The engineer equipment, supplies and construction materials needed to build the U. S. bases in England and

supply the armies in France would fill a freight train 20,000 miles long.

600 Beaches Studied in Advance

U. S. engineers in ETO made detailed studies of over 600 beaches and from these studies the actual invasion beaches were selected. Large-scale models, beach maps and charts were furnished for all allied forces in the initial assault—British, Canadian and United States. Special beach and tidal information, of a type never before used in amphibious operations, was produced for the assault on Normandy.

Engineers prepared detailed plans for the reconstruction of all ports, roads, railways and utilities in the areas attacked by our American armies. Much of this material, such as heavy railway bridging and other items requiring long periods of time for procurement, was ordered almost two years ago. Accurate requisitions for millions of feet of lumber, reinforcing steel, rails, wire, structural steel and construction equipment were placed in the United States and stockpiled in Britain before the invasion.

Engineer services in ETO operated training schools giving courses in construction of road bridges, railway bridging, camouflage, mine removal and neutralization, fire fighting, explosives and demolitions and water perfecting.

Special engineer groups were trained in port construction and repair, and included perhaps the most versatile group of practical and technical men ever brought together.

Engineer Intelligence Division made special studies of airfield sites, dropping areas for paratroops, and critical bridges that were recommended for destruction by Allied Air Forces in order to harass the enemy.

(Left): American-made clamshell and "6x6" truck being used by U. S. Army Engineers in England. (Right): Material pile and batching plant, U. S. Airfield, England





Somewhere in France. The initial grading of the field site is done by these bulldozers and huge drags which fill in the depressions

Special Brigades Aided Actual Landing

Engineer Special Brigades are a new type of unit developed for amphibious warfare. Their mission is the maintenance and operation of landing beaches and the movement of cargo across these beaches. The most spectacular development of this war has been our ability to move more cargo over open beaches than is handled by some of the world's largest harbors. These Engineer Brigades clear mines, remove obstacles, breach anti-tank walls and transport cargo from landing craft, ships and beach vessels to supply the troops behind beaches. These men worked under fire constantly during the early days of the invasion, but were so successful in accomplishing their mission that there was never any question of adequate supplies for our troops. These Special Brigades landed with the assault troops on D-Day.

The Combat Engineer Battalions with each division assisted in the assault on the fortified German positions, and it was their responsibility to bridge walls, remove mines, build bridges and assault strong points in order to keep the infantry moving and to supply vehicles, armor and guns, advancing against the Germans. All river crossings for advancing troops were made by Combat Engineers, using assault boats, rafts, and finally building fixed or floating bridges for the main forces to use in crossing.

Water supply for the American Army is also an engineer responsibility. Each division engineer combat battalion furnishes water for its division, while other engineer units in corps and army areas provide water for supporting troops.

Reconstruction of the major port of Cherbourg, and the other minor ports, such as Isigny and Carentan, was begun by engineer port construction and repair groups, assisted by general

service regiments. Roads, bridges, railroads, power transmission lines, water works, power plants, sewage disposal plants and other utilities are a responsibility of the engineers.

The engineer service constructs the facilities and distributes the petroleum, oil and lubricants (POL) in bulk from tankers to forward distributing points. Special engineer pipe line companies are trained in the rapid construction of pipe lines and have virtually built pipe lines up to the fighting front. This ingenious development of present war brings vast quantities of gasoline up to the front where it is needed, and, at the same time, reduces road congestion by obviating the need for hundreds of tank trucks that would otherwise be required to move this vital supply.

▼

Traffic Tests of Highway Lighting

A five-mile section of the White Horse Pike, State Route 43, near Ab-

secon, N. J., recently served as a laboratory for obtaining data regarding the value of lighting rural highways.

The Electrical Division of the New Jersey State Highway Department and personnel of the Public Roads Administration conducted a series of tests during Labor Day week-end to compare the driving habits and nervous tension of motorists on lighted and unlighted highways.

The tests consisted of two separate yet related studies. During the one study, the speed, transverse position on the highway, and the distances to other vehicles traveling in the same and opposing directions were recorded for each vehicle as it passed a point on the unlighted section of the highway and again as it passed a point on the lighted section.

The second phase of these studies consisted of obtaining data regarding the nervous tension of drivers and passengers while traveling over the highway in the daytime, at night on the unlighted highway, and at night on the lighted highway.

U. S. Engineers lose no time after the landings on a beach in France to start laying out roads on the soft sands for the heavy vehicles and equipment yet to come ashore



Simple Method of Preventing Spring Breakup of Roads

INVESTIGATIONS have shown that frost heaving in soils and the resulting pavement and base disintegration is associated with the formation of layers of segregated ice. These ice lenses, states one calcium chloride manufacturer, are formed by the growth of ice crystals. The total thickness of such ice lenses depends upon the quantity of water available either through capillary saturation of the soil or free water together. Additional factors upon which the thickness of ice lenses is dependent are the type of soil and frequency of temperature changes.

Practical methods of preventing damage from frost heaving are few. However, a cheap, effective way, according to this manufacturer, is by impregnating the soil with calcium chloride. A mixture of 66% pea gravel and 34% powdered or flake calcium chloride may be placed in pockets at intervals of 4 ft. in silt, 5 ft. in clay and 6 ft. in graded mixtures and 20 to 30 in. deep and 8 to 12 in. in diameter. These flakes will dissolve and migrate in all directions, thus lowering the freezing point of water in the voids and protecting the soil from damaging frost heave.

The purpose of the gravel mixture is to introduce calcium chloride to the

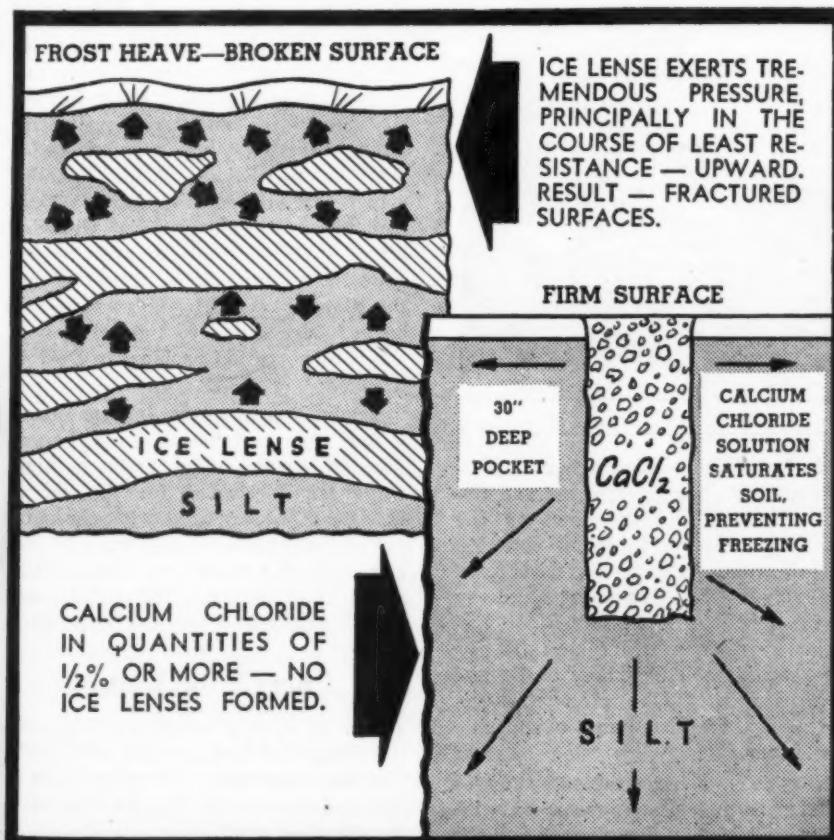
extent that the voids would be filled, but to not leave a hole in the road when the calcium chloride has gone into solution. The hole should be capped with a wearing surface.

Another method now highly favored follows the foregoing method, including the use of flake calcium chloride in the hole, except that the diameter of the hole should only be 2 to 4 in. In this case the hole bridges over without any detrimental results. This eliminates the necessity of using pea gravel or other filler material.

49% Traffic Increase on New York Toll Bridges

Motor vehicle traffic over the bridges controlled by the Triborough Bridge Authority, New York City, for the first 6 months of 1944 was 48.8 per cent heavier than for the corresponding period for 1943. Revenues reached \$1,755,382, a 44 per cent increase over the previous year. The bridges handled a total paid traffic from Jan. 1 to June 30 of 9,218,216 vehicles as compared with 6,159,839 for the corresponding period of the previous year.

The Triborough Bridge Authority operate five bridges and the parking field at Jacob Riis Park.



Meetings Ahead

American Association of State Highway Officials, annual meeting, Netherland Plaza, Cincinnati, Ohio, Nov. 27, 28, 29 and 30.

American Road Builders Association, annual meeting, Stevens Hotel, Chicago, Ill., week of Jan. 14.

Associated Equipment Distributors, annual meeting, Edgewater Beach Hotel, Chicago, Ill., Jan. 21-24.

National Sand & Gravel Assn., Hotel New Yorker, New York, N. Y., Jan. 23-25.

National Ready Mixed Concrete Assn., Hotel New Yorker, New York, N. Y., Jan. 24-26.

National Crushed Stone Assn., Hotel New Yorker, N. Y., Jan. 29-31.

Snow Fighting Began in July

(Continued from page 65)

we hear from the man in charge. By this method we avoid much confusion and wasted effort.

We occasionally have an ice storm in the fall, when we find it necessary to sand the hills and curves. This is done with a mechanical spreader attached to a truck, using sand mixed with calcium chloride. We also leave piles of treated sand along the shoulder on bad hills where trucks may stall or skid; in this manner, two or three drivers will often sand the hill for us hours before our equipment could reach it.

However, as soon as winter sets in in earnest there is no trouble from ice. Some roads are made slippery by packed snow, but sand and chloride in the amounts we can use have little effect on this, and most of the people who drive our roads become accustomed to it and drive accordingly.

We find that when the weather is right for ice to form, a break in the clouds giving a half hour of sunlight will usually melt all the ice that has formed on black surfaces. For this reason, and also because our distances are so great, we only attempt to sand the more dangerous places and warn the public of the conditions by means of the radio.

Engineered to Keep Contractors' Vital Equipment on the Job All Winter

Whenever the thermometer reads below 45° be sure you have AMALIE SUB-ZERO in the crankcase of every engine-driven unit you operate. Then you'll have easy starting and sure protection against sudden temperature drops... *plus* protection against temperature RISES, too! AMALIE SUB-ZERO pours at temperatures as low as 25° below, depending on S.A.E. grade. Yet it gives complete lubrication when the mercury takes a sudden climb. Back AMALIE SUB-ZERO up with the right AMALIE Winter Grade Lubricants in every bearing.

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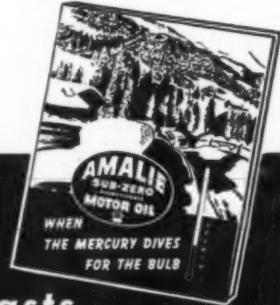
Progress Toward Coordinating Detroit Post-War Express- way Plans

By letter to the Editor, from Glenn C. Richards, Commissioner of Public Works, Detroit, Mich.:

The Michigan state highway department has been planning a cross-town highway in Detroit for several years, and the Wayne County road commission has been planning a north-south expressway in Detroit. Recently the Street Improvement Committee of the city of Detroit,



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Wayne County road commission whereby the three governmental agencies would set aside yearly allocations of funds to be used for expressway construction within the city. The agreements have been nearly consummated and will be in effect as soon as approved by the State Administrative Board.

It is anticipated that the Crosstown and the John Lodge expressways will be the first projects to be constructed. This will depend somewhat on federal assistance and approval by the Bureau of Public Roads.

We have secured the services of Mr. Malo, formerly road engineer of the Michigan highway department, to represent Detroit on all planning of express highways within the city. The Detroit city engineer's office has assigned Mr. Malo to particularly study the Grand River route and to prepare estimates of cost and recommend alignment. No detailed plans have been started on the Grand River Expressway as yet and I doubt if detailed plans will be started until the other two projects have been fairly well completed.

Mayor Jeffries has appointed a transportation board, made up of the city traffic engineer, the president of the City Plan Commission, the Corporation Counsel, the president of the Detroit Street Railway Company (municipally owned), the Wayne County Road Engineer, and the Commissioner of Public Works. This board was assigned the duty of procuring the services of consulting engineers specialized in transportation to make a survey and prepare an over-all transportation plan for the city, combining and coordinating the public and private transportation systems. These consultants and this board will analyze the express highway plans as well as street widening plans, surface street car systems and subway studies. It is expected that the plan prepared by this board will be a future guide to the solution of the transportation problem in Detroit.

Traffic Decreased on Indiana Roads
—A 5.3 per cent decrease in the volume of traffic using Indiana highways was recorded for August of this year as compared with the same month in 1943. A decrease of 53.1 per cent was noted for August this year as compared with the same month of the last pre-war year, 1941.

"Ain't It the Truth?"

(Seen on a city official's office wall)
"When you find a public official who pleases everybody, there will be a glass plate over his face and he won't be standing up."

12,000

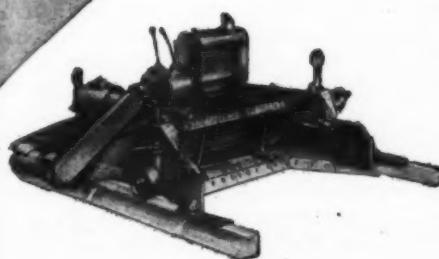
LINEAL FEET OF FINISHED

25 FOOT SUBGRADE

IN

8

HOURS



THAT'S A BROAD CLAIM TO MAKE!

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FEATURES

- 1-Quickly adjustable to variable digging depths.
- 2-Cuts in either direction without turning.
- 3-Works around curves without binding and tows sideways through narrow places.
- 4-Digs right up to the side forms, eliminating hand cleaning.
- 5-Simple lever adjustment for spoiling at either side.

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"Getting Ready for Winter"

DURING recent years Minnesota has had two experiences in which the weather-maker apparently decided to do something unusual, and proceeded to do so, with the result that we had severe blizzards on Nov. 11, 1940, and Nov. 7, 1943—both of which found us partially unprepared. This year we decided to set the date of the first blizzard ourselves, and we hope we are early enough. The date has been set for Nov. 5, and our entire organization has been instructed to have everything in readiness under the assumption that on that date we are going to have an unusual and severe snowstorm and blizzard.

All motor equipment expected to be used for snow plowing during the coming winter has been ordered to have a trial run made, with all plowing attachments mounted, after which the attachments can be removed if they interfere with other maintenance operations. Our reason for this requirement is to make certain that all equipment will be checked and in readiness and operators will refresh their memories on duties of attaching units and operating them, before the storm strikes.

Checked to Last Bolt

It is assumed that if the snow plow operator mounts his equipment, makes a trial run with it, and then dismounts it, he will store it at a convenient point and he will know for a certainty that he has all the pins, bolts, etc., to attach his plow and go to work.

Instructions have gone out to get the roadsides cleaned up, prepare sand stockpiles, etc. Our program insofar as sanding is concerned will be restricted to hazard points and dangerous parts of roads such as curves, hills, intersections, etc. We are not planning on sanding our roads continuously, except immediately adjacent to metropolitan areas where there is a considerable amount of suburban traffic resulting from people going to and from work daily.

Our labor supply should be adequate insofar as our regular skilled or key organization is concerned. Intermittent and temporary labor needed to help out in emergencies, such as intensive storms over a period of a few days, will probably be rather difficult to get. The outlook for the possibility of hiring contract equipment and personnel for these emergencies is better than it was a year ago.

By C. L. MOTL

Maintenance Engineer, Minnesota State Highway Department

Snow Fence, Early Problem

One of the biggest uncertainties in connection with our snow battle is the erection of snow fence to take care of the early storms. Ordinarily it is difficult to anchor the fence with sufficient security so it will withstand high winds before the ground is frozen. Our early storms usually start with a rain, which first softens the ground, and then end up with a blast of wind driving a heavy fall of snow ahead of it. Under these conditions we often have quite a lot of our fence blown down. We are also confronted with objection on the part of farmers who wish to continue their farm work as late as possible, and quite often the erection of snow fence would interfere with such operations as plowing and other late fall field work.

Shop Work Done

All of our shops reported as of Oct. 1 that their equipment repair schedules were practically up-to-date; and while we have had, and still have, occasional serious delays through inability to secure some repair part, this is not general or widespread. Our mechanics, most of whom are older men and have been with the Department for a considerable time, were not called into the service and did not leave the Highway Department to take jobs in war industries. We, therefore, are not confronted to any great extent with the need of employing a great deal of inexperienced help.

During the past two years the Maintenance program in Minnesota was held to an absolute minimum and every special project or undertaking was carefully scrutinized as to its actual necessity and need. If it could be gotten along without, the work was deferred. This general over-all policy resulted in conservation of our equipment, particularly tires, and made it possible for the state to do a great part of its work with a reduced, but experienced, personnel. This policy, which has been in effect more than two years, has resulted in our arriving at the present stage with equipment that has been saved the ordeal of excessive wear and tear, and which still appears to be in readiness and capable of performing work required of it without too much difficulty.

At the present writing we feel that

we have passed beyond the critical stage of our operations insofar as they have been affected by the war. A limited number of contractors are available and are bidding on maintenance work, and our expectations are that during the coming year the situation will be much improved from the standpoint of getting a substantial amount of maintenance work done by contract at suitable prices.

Looking Ahead

While we are making preparations to start our winter on or about Nov. 5th, we are not overlooking our preparations for the 1945 maintenance program. We are arranging now to let contracts for the production and stockpiling of substantial amounts of gravel and crushed stone material at strategic points along the trunk highways, so it will be conveniently available next spring. It is felt that the production of this material during the late fall and early winter will fit in well with contractors' year-around programs and will avoid the necessity of doing a large amount of heavy hauling over road surfaces during the early spring when the subgrades are less stable due to effects from frost.

In the final analysis it can be said that we are very optimistic insofar as our future operations are concerned; and while a year ago all of our policies were directed toward conserving anything and everything that could be conserved, we are, on the other hand, this year planning on carrying forward a very substantial program of maintenance work beginning early in the winter of 1945 and carrying on throughout the year. We are not doing this with the idea that the war is over, but we feel that the extremely conservative efforts made in the past, justify our taking a more liberal attitude at present, due to the improved situation in the war effort.

Truck Speeds on Indiana Highways

The average speed of all trucks clocked during a recent four-day survey by the Indiana State Highway Commission from stations on several roads carrying heavy volumes of traffic was 35.88 miles an hour. It was found that the average weight of trucks clocked also for speed was 14,840 lb. and that the heaviest truck clocked weighed 76,200 lb. and was traveling 32.8 miles an hour. The survey also showed that on the average empty trucks traveled from 2 to 4 miles an hour faster than loaded vehicles.



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Lenses available in red or amber letters "STOP" and red, amber and blue in plain lens. These 80-times-per-minute flashes warn in time to avoid accidents. They protect the public—your men—your equipment. They're used by many states, cities, counties, towns, parks, bridges and utilities.

IMMEDIATE DELIVERY CAN BE MADE.

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ROADS AND STREETS, October, 1944

Post-War Notes

A postwar program designed to increase the present facilities at Jones Beach, popular resort near New York City, and to expand the causeway system leading to the beach has been approved by the New York State Postwar Public Works Planning Commission, it was announced by Robert Moses, president of the Long Island State Park Commission.

The program will cost an estimated \$5,765,000, with \$5,000,000 of this earmarked for construction of a causeway and bridge over Great South Bay. \$40,000 already has been allotted to pay immediate expense of preparing blueprints.

The proposed causeway, to be known as the Captree Parkway will include a bridge, 9,980 ft. long.

* * *

The Indianapolis Citizens Postwar Planning Committee has recommended construction of depressed streets under tracks instead of elevations for a postwar railroad separation program.

* * *

A \$43,527,000 postwar public works bond issue was approved by St. Louis voters at the August 1 election. To expedite the program the city contemplates engaging private consulting engineers to prepare plans and specifications for the work.

The following projects are proposed:

Bridges and viaducts, \$1,778,000; streets, \$7,820,000; airports, \$9,897,000; sewers, \$7,957,000; hospitals, \$950,000; parks, \$3,625,000; fire protection, \$800,000; telephone-telegraph system, \$2,200,000; zoo, \$750,000; art museum, \$250,000; waterworks, \$750,000.

Eight municipalities and the unincorporated area of St. Louis County, Missouri, have submitted a proposed postwar public works program of \$21,398,000.

▼

A.E.D. Meeting Jan. 21-24

The 26th annual meeting of Associated Equipment Distributors will be held at Edgewater Beach Hotel, Chicago, January 21-24, 1945, it was announced recently by C. F. Winchester, executive secretary of the organization with headquarters in Washington, D. C.

The Executive Committee of A. E. D. met at Hotel Coronado, St. Louis, October 13-14, and formulated plans and program for the next annual meeting. Disposal of surplus governmental equipment was an important topic of discussion.



WPB Control Over Used Construction Machinery Removed

The War Production Board on Sept. 28 revoked Order L-196, which controlled the sale of certain critical types of used construction machinery.

The order required distributors and contractors owning shovels, cranes, draglines, motor graders and track-laying tractors to register their equipment in WPB regional offices, to report change of status of the equipment, and to obtain WPB approval of sales, with certain exemptions.

Through these controls over used equipment, civilian needs that could not be filled from new production due to heavy military demand were filled insofar as possible by idle used equipment, WPB said.

When first issued in August, 1942, Order L-196 covered more than 100 separate items of construction equipment. The number was reduced through successive amendments and exemptions as certain types became less critical or were found to change hands readily without assistance.

Reasons for revoking the order are summarized by WPB as follows:

(1) The great majority of used cranes, shovels, motor-graders and track-laying tractors in good condition are busy. According to a survey made in June, 1944, by the Construction Machinery Division, only 10 per cent of the items listed in regional inventories through L-196 registration were idle. Many of the idle machines were awaiting repair or were only available for sale or rent in combinations with other items. Some of the idle machines were old models and their rental or purchase was not economically feasible.

(2) Contractors now want new machinery, not used items. This conclusion was reached as a result of a program carried out by the Construction Machinery Division to ascertain which applicants for new machinery would accept used equipment when their applications were denied. A large percentage of the applicants were not interested in obtaining used equipment.

(3) Most users of construction machinery have adjusted themselves to wartime conditions. They are getting along with the equipment they own by keeping it in repair, and are themselves taking advantage of opportunities to buy used equipment. There is also considerable evidence that many of them prefer to wait and buy new machinery after the termination of the war in Europe instead of buying used equipment now.

In the two years during which L-



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and more profits**

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Cable Dozers

... The full power of your tractor drives on the blade to move more "pay dirt"

Heil Hi-Speed Cable Scoops give you extra speed on long hauls . . .



This big 15-yard tractor scoop is push loaded in 40 to 50 seconds — and hauls at travel speeds up to 20 miles per hour. The tilting floor gives positive mechanical push-out from the bowl and spreads load evenly. It's one of Heil's "bigger yardage at less cost" units that you will need in your post-war business. Write for bulletins.

SEE YOUR INTERNATIONAL TRACTOR DEALER



THE PHOENIX CO.

GENERAL OFFICES

MILWAUKEE 1, WISCONSIN

ROADS AND STREETS, October, 1944

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R-37

From full floating blade
action to extreme height
for throwing

HEIL BULLDOZER
gives you "extra" versatility
for a wide variety of jobs

Tailormade for Cletrac Tractors

One of the big reasons why you like this unit is the fact that you get fast, accurate blade control with the sensitive, dependable Heil hydraulic system. You can let the blade float to "follow through" on "over-the-bank" thrusts, or you can raise it to extreme height.

This Heil hydraulic system is the next thing to a perfect leak-proof unit. It stays in adjustment and gives a minimum of trouble. Perfect balance, full visibility, and many other famous Heil features assure you of many years of satisfactory service and extra profits.

R-38

Write for bulletins

**Control Lever Operation is simple,
easy, convenient, and troublefree**

RAISE position is back; HOLD position is center; DOWN position is forward. To float blade, push control lever to DOWN position until blade touches ground—then push down on control lever knob to release catch and move lever to extreme forward position.

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THE HEIL CO.

GENERAL OFFICES

• MILWAUKEE 1, WISCONSIN

196 was in operation, approximately 16,000 items of used construction machinery were placed at work by WPA.

**Disposal of Surplus War
Property**

The bill (HR-5125) providing for the disposal of surplus war property was signed by the president on Oct. 3.

The new law lists 20 objectives including preservation of our competitive system; free enterprise; the utilization of normal trade channels; the maintenance of domestic economy and of international economic relations, and others.

The bill provides for a surplus property board, consisting of three members, to be appointed by the president, instead of an administrator. The board is given general supervision and direction over the care and handling and disposition of surplus property and the transfer of surplus property between government agencies.

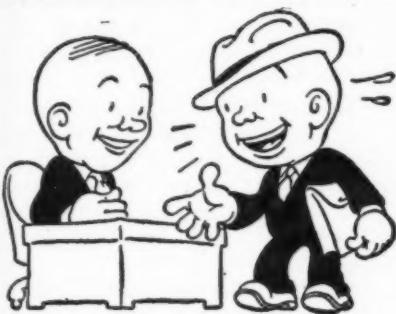
The board is required to advise and consult with other interested government agencies affected by the disposition of surplus property. No provision is made in the measure directing the organization of industry advisory committees.

All surplus property of one federal agency must first be made available to other federal agencies for their use prior to its disposition. But, no government agency can acquire surplus property of any other government agency unless it has appropriations available to pay for the property.

No donations are authorized, except when the property has no commercial value or the cost of its care and handling and disposition would exceed the estimated proceeds. In such cases the agency may donate such property to any agency or institution supported by the federal government or local government, or to any non-profit educational or charitable organization.

Agencies authorized to dispose of property under the act may dispose of such property by sale, exchange, lease, or transfer, for cash, credit, or other property, with or without warranty, and upon such other terms and conditions as the agency deems proper. However, in the case of raw materials, consumer goods, and small tools, hardware and nonassembled articles which may be used in the manufacture of more than one type of product, no extension of credit under the Act shall be for a longer period than three years.

Equipment Maintenance



"-But Don't Use My Name"

Anonymous thoughts and ideas, beefs and bouquets, jotted down during interviews by the "Roads and Streets" field staff. This batch of notes happens to be from the east, but some of the ideas expressed make good reading anywhere

To Paint or Not to Paint? Union Oilers; Coal Stripping; Other Contractor Problems

(Contractor) "I don't believe that idle equipment goes to hell as fast as many of the contractors say it does. This fear is one of the reasons why so many contractors have sold practically all their equipment. Why, most of them in this town haven't got enough equipment on hand to dig a cellar. We load idle equipment with oil during the months we don't use it. We also paint carefully and, of course, where there is a nice paint job, we don't have to worry about rust. But most contractors don't bother with painting the equipment they leave outside, or with slopping some used crankcase oil on it like we do.

"We have learned a lot on the jobs of building airfields. That's 24-hour work and there is no chance for supplementary repairs. You must repair everything right on the job and right away, whereas on ordinary jobs you could fix things overnight. That means a bigger expense, more chance for lasting damage to the equipment, and often you must later on rebuild a whole section because you could not stop to fix it in time.

"Most of our trouble with equipment on the job comes from the oilers—union men we must carry, and who do lousy work. Bearings and bushings wear out all the time because they are not properly attended to. Fortunately, we put in a large stock of bushings and bearings in 1939.

"Some parts don't perform the way they used to. Crowd chains on shovels are inferior now. They formerly lasted a year in ordinary service.

"Some contractors around here have gone in the coal stripping business and have lost their shirts. Whether

these fellows have rented their equipment to coal strippers or have been doing the stripping themselves, they have all taken a shellacking. Road equipment is not stripping equipment. They have used shovels where they should have had draglines. When you have a dragline and a 100-ft. boom, you don't need bulldozers to push the coal around.

"Coal mine operators take care of rented equipment when they make money, because good maintenance helps them to earn more money. But if they lose, they don't want to spend time and money on maintenance. They say: 'Why should we pay oilers \$12-15 a day?' Then your cats, your sprockets and your rollers wear out in no time and your equipment isn't worth a damn when you get it back."

▼

Three Good Ideas

(Contractor) "With repairs you got to help yourself these days. Between our blacksmith and our welder we can do almost anything. Right now we are repairing the Mack truck. We had a body for sand-carrying on it, but want to use it to transport the bulldozer. So we are welding channel irons from an old finishing machine on it, and we have an old platform to go on top of it.

"To keep cables from going to pieces, we paint them with heavy gear grease before we use them. Just for sitting around, a lighter waste oil will do. . . . Most of the rust is found on parts that don't move very much in operation but are movable. They are usually forgotten in lubrication.

"We have only recently started with welding, but the men make great progress. The gears on our big shovel were gone completely. We bought armor plate scrap, cut it to shape and welded it on the wheels."

Special Trick in Welding Grouser Cleats

"We weld cleats onto our tractor grousers and have found that they should be welded by leaving a 2-in open space between cleat and grouser about three inches away from the outside edge, to allow for the weakest point of the grouser where it is bolted to the chain.

"I believe if it was not for the welding machines, contractors would all be out of business. Some of the jobs we do may look awkward, but they stick together. . . ."

▼
Do you Have These Troubles, Too?

(Large Contractor's Chief Engineer) "Most of our time is spent on the repair of engines. It's either abuse by the operators or dust that causes most breakdowns. Operators just don't care any more. They pay no attention to bearings, so that these will burn out frequently. They fail to check sufficiently often on oil. The small stuff is operated by laborers. They are more negligent than the operators who may 'phone me in case of a breakdown, and report what trouble they are having.

"Practically all of our engine trouble is due to lack of oil, or cement dust getting into the oil. When we get the machines back, we flush them out with oil, so as to get rid of some of the abrasive particles which get into the cylinders.

"We buy our gasoline directly from the refinery in drums. It contains quite a bit of water which forms sulphuric acid when it gets into the oil. Oil filters are a big item with us. They are supposed to keep the abrasives out—particularly in pumps and compressors.

"Many radiators of mixers have to be replaced because concrete gets into

the cores and interferes with the heat exchange, causing the motors to run hot and thereby burning excessive oil. I wish there was a solvent for concrete, because it can't be removed mechanically.

"Load limits mean nothing to the boys in the field. They pack stuff until the chassis cracks. It would be a doggone good idea to have a device on trucks to make overloading impossible."

Who's Right — Mechanic or Boss?

(Contractor's Chief Mechanic) — "I am fixing a gasket for a gas motor driven pump. New gaskets don't hold up as well as the used ones. So I am putting the old one back on the cylinder.... All our valves need new grinding. That happens all the time, but the boss won't let me buy a grinder or any of the other machine tools I need all the time. Now, you can't get them any more, but I started belly-aching for them years ago. I used to drive down to another shop to grind valve heads myself, but now they won't let me do it any more. We always lose a lot of time with taking the valves down, waiting and returning.

"We need regular tools here, a lathe and a drill press. The boss just says, 'Don't bother me with it now,' and keeps on paying for repairs made on other people's machines. Having our own machine tools would save us plenty of money...."

"Regardless of how carefully you handle your equipment, breakage by fatigue is unavoidable. And breakdowns cost money. Actually, I have to figure about 5 per cent of every job for maintenance and repair. On a \$500,000 job I had, I spent from \$25,000 to \$30,000 on repairs.

"Most contractors get the accounting done at the end of the year and then suddenly find out that they have not made any money because they forgot to include equipment maintenance cost in their calculations...."

Tired Waiting at \$85 a Day, So Welds Housing

"We had a motor crane, on which the housing was broken, sitting around here for two months. We tried everywhere for parts, called ODT without success. Finally we bought an old truck housing, cut out the bowl and welded it on to the crane housing. We could do this because the base of the two bowls was of about the same shape. A lot of people told me this could not be done, but it worked fine, and I had been losing \$85 a day by having the crane sit in the shop.

Emergency Repair and Shovel Saved Delay

"To make machines last 'til 4 p. m., that is the problem. When you have 20 laborers and 10 trucks waiting, the welding machine is a great help. We had a fracture of track bearing housings. We slapped a piece of iron on both sides. It held not only that day but for weeks after. This happened on a (Blank) shovel. A bearing cap broke. We took a piece of steel, formed it hot, loosened the nuts of the broken cap, and tacked the new piece on it. Mind you, we tacked it onto cast iron and it held.... We did that by using a good flux."

Asphalt Distributing Contractor Trained Own Machinists, Made Tank Trailer

"When the war started, the government tightened up on asphalt and all tar products, so we took some of our men and made machinists out of them and put them to work in our machine shop. We got a couple of lathes and started a small war plant right here. We make some airplane parts and also a few things for a cable company.

"We have had to make a lot of our own equipment. We have a 3500-gal. tank trailer that we made. We bought an old Fruehauf trailer that was going to be junked and rebushed it all over, then bought some steel plates and had them shaped and welded them together to make the tank. We also make our own distributors by rigging a small Hercules engine and a Ford differential together. We have two stone spreaders that we made, too. You won't find anything like them anywhere else. We used scrap steel to make the body and hooked a couple of gears to the drive shaft to drive the spreader."

Thinks Operators Won't Take Care of Repainted Equipment

[Note: Editor disagrees and so will many others.]

(Contractor's Yard Manager) "We don't do any painting of our equipment. The determining factor in that is the impression you want to make on the public. We don't have to make any impression on the public. We get all our jobs on competitive bidding. We used to feel that it was good psychology to paint our machines. We had the idea that it would be good for the operator, from a psychological viewpoint, and make him feel a little proud of his machine so that he would try to take better care of it. We gave up on that, though. We'd fix the machine up and then of course it would be the last man on the line who did the painting, some man that we didn't

have any work for right at that particular time, so you can imagine what it looked like. When the operator would see it he would get the idea that the machine was a junk pile that we were trying to make look nice so he would run it. So we quit painting. Just a few weeks ago we overhauled a Buffalo roller and the men in the shop wanted to paint it, but I wouldn't let them. I'd rather keep it with the old original factory paint on it. The machine is perfect, but if I painted it any operator that I gave it to would think there was something wrong with it. I don't say that painting isn't good, but I don't see where it helps too much. It might stop a little rust here and there but it has no bearing on the working of the machine.

"We use protective and rust-proofing greases sometimes. Only when we know that the machine is going to be idle for a long time. Then it pays to do it."

Special Cleaning Outfit Saves Money in Highway Department Shop

(Div. Shop Superintendent): "Portable cleaners are mighty handy. We have a stationary outfit that we made ourselves. It's better for in the shop than a portable jenny would be. We have about a 20 hp. boiler here and we've hooked up a tank that holds about 120 gallons of solution. We use a commercial solvent. We force the solution into a steam line by air compression so that we get a hot steam solution with a lot of pressure. That takes off everything except tar and it will even knock off large hunks of tar, but for the small pieces that are really stuck on we have another preparation. We have a product called (Blank) that we spray on to soften the tar. We clean all our equipment like that before painting and I like to clean in between, too, if the machine is in and I have the time. Cleaning in maintenance is very important. I sure do think it's good maintenance. It keeps dirt and grit away from the cups so that it doesn't mix with the grease and get into the bearings and bushings and it washes off the old grease that's full of dirt. You keep your machines clean and you save a lot in wear and repair."

"I've always tried to paint every piece of equipment once a year. A lot of our equipment is out all summer and painting does a lot more than just keep your machines looking good. If you let them go and don't paint, they start to fall apart, then you start patching the body up. When one thing starts going, it seems to affect the rest of the machine. We're out of paint right now. I guess the pur-

chasing division hasn't been able to get it for us.

"In cleaning we have a little trouble on tar. We get quite a lot of tar on the equipment sometimes and have

a hard job getting it off. Different companies claim to have a cleaner that will take it, but it doesn't work. Chemists have solvents for everything individually but when it comes

to putting them together to give us one cleaner that will do the job, that's another story. And we can't carry a whole line of cleaners in stock just to use one for one thing."

Wheel Carriers Salvaged With Jig

The method worked out here is adaptable to the salvage of any valuable or presently irreplaceable casting, being of course specially economical where a steady run of such repairs can be handled

By CLINTON STUTTER

Central Motor Repair Shop
New York City Department of Sanitation

IN SEPTEMBER of 1941, a salesman visiting our shop noticed a pile of cast-steel rear wheel carriers awaiting repairs. Some seemed beyond hope. He explained that his company was salvaging a great many carriers which were worn on the feloe parts, by cutting them down and welding a complete new feloe ring to the old hub and spokes. It so happened that in this pile of carriers each had one or two broken, missing, cracked or twisted spokes and after looking them over he said, "Well, we can't do anything with those." That started a train of thought in my mind —Why can't we save some of these? If a carrier has only one or two broken spokes, why can't we cut those spokes out and replace them with good spokes cut from other carriers which have three broken spokes? In that way we may be able to save at least 50% of these carriers which heretofore had been junked.

I knew this would require a jig or fixture to cut the spokes accurately enough to be interchangeable. The jig was designed and built in our machine shop shortly after. There were no elaborate drawings or blue prints. I laid the basic setup out on a piece of black cardboard, marking the various dimensions full scale with chalk. This permitted easy erasure and changes which were numerous.

The accompanying photographs and following description will, I trust, convey the idea comprehensively.

The bed is a piece of $\frac{1}{2}$ -in. boiler plate 22 in. square. This sets in an angle-iron tray made of $1 \times \frac{3}{8} \times \frac{1}{8}$ -in. iron. The legs are $1 \frac{3}{4} \times \frac{1}{2}$ in. angle-iron 30 in. high, braced about half way down with the same size angle-iron used for the tray. The frame is welded into one unit but the bed plate is removable. Four old steering arm balls are welded to the legs to facilitate moving the unit. The center shaft (not visible in photo, being hidden by casting) is a piece of cold-rolled steel $1 \frac{1}{2}$ in. x 6 in. This is centrally located in an old 5-in. O.D.

thrust bearing, which is protected from flying oxide by a steel ring $\frac{1}{4}$ in. thick by 1 in. high. A guide plate to fit the hub bore of wheel carrier and center stud is placed over the thrust bearing. A stop to locate the wheel carrier through any of the brake drum bolt holes is provided with a removable pin.

The outside cutting torch carrier guides are $1 \frac{1}{4}$ -in. round stock 14 in. high above the plate. The center guide is $15/16$ in. round.

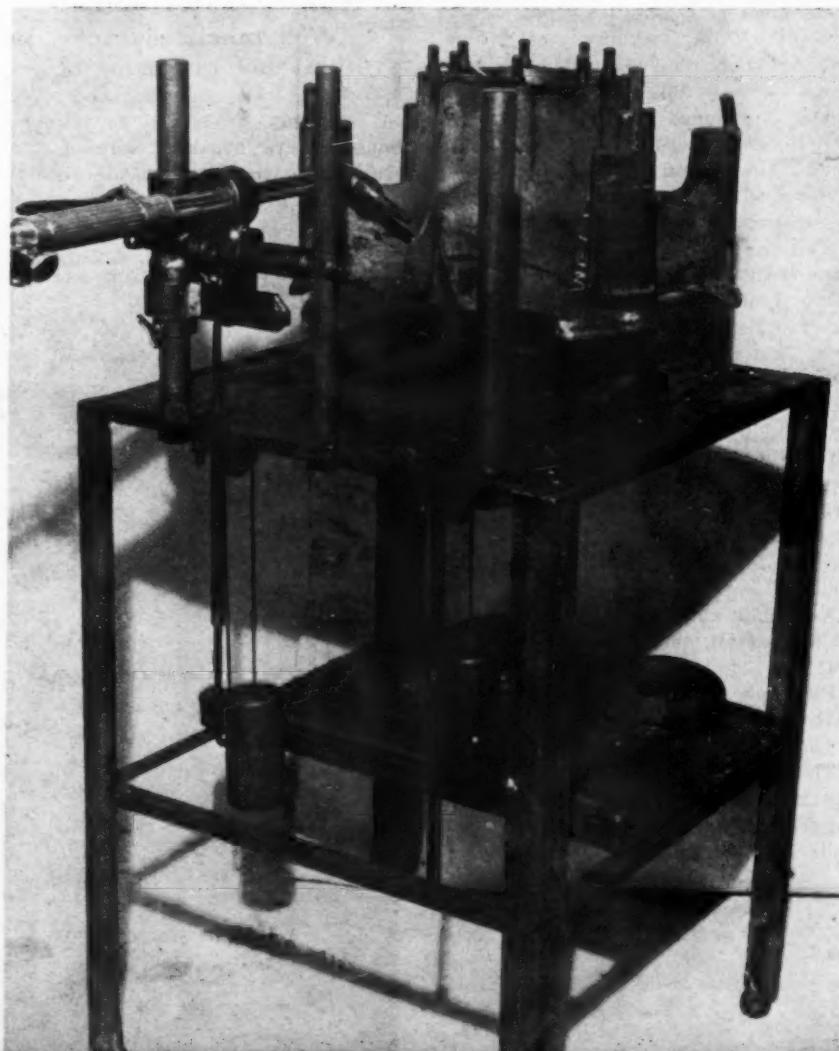
The torch carrier (see photo) presented the greatest problem. Motion in all directions was necessary and

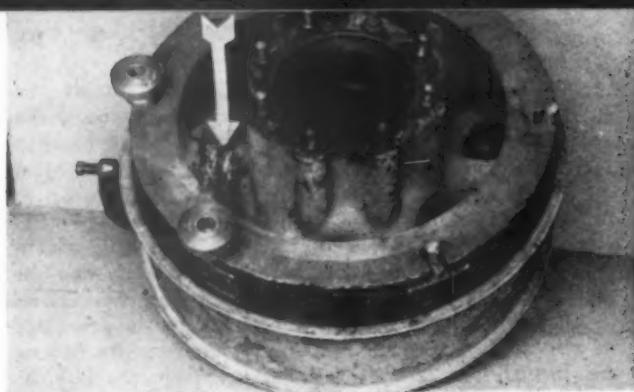
has been provided, vertical, horizontal and lateral. The torch can be swung in a 360° circle in the vertical or horizontal plane but is prevented once set from changing its lateral or center distance from the hub, by two binder screws which clamp the tubes of the torch tightly in a two-piece revolvable and removable flanged block. This block is placed in a ring on the carrier which must be large enough to permit the head of the torch to pass through.

The counterweights are just heavy enough to allow the torch carrier assembly to move down slowly by its own weight. The cables were taken from a discarded speedometer drive and are run over small grooved sheaves.

The carriers to be salvaged are set properly on the center guide, the stop pin is inserted, the cutting torch is set laterally in the most advantageous position regarding the cracked or broken part and the cut is made on one side. The carrier is then trans-

Cutting setup





Completed weld — Carrier ready for use



Setup for Arc "Tacking"

ferred to the other guide post and the cut is made on the opposite side. We now have the damaged spoke removed and the cut is clean, straight and true. This carrier is then removed and the hopeless carrier with several remaining good spokes is handled the same way with the same lateral setting of the cutting torch. This, of course, leaves a gap when set in the fixture for arc welding, but this gap is readily filled and provides for 100% bond by the filler rod.

Set-up for Arc Welding

The set-up for arc welding is simple, the proper size spacer rim is shipped over the wheel carrier and clamped tightly to two good spokes, evenly spaced. An extra deep "C" clamp is used so as to clamp the rim in the center of the length of the spoke. A $\frac{1}{2}$ -in. thick flat steel ring 18 $\frac{1}{4}$ -in. O.D. and 14 $\frac{1}{8}$ -in. I.D. notched out to clear the rim lug studs in the spokes is clamped on the end faces of the fixed spokes, the replacement spoke is then set in place and clamped to the steel ring by means of a hand wheel screwed onto the rim lug stud. The beveled feloe end of the spoke is brought snugly up against the spacer rim and clamped with another "C" clamp. The welder then proceeds to "tack" the spoke securely. After this is done the plate and rim are removed and the regular weld is completed in the usual way.

The jig heretofore described cost approximately \$227.00 to build. Material \$8.00 for steel and angle iron plus labor, \$219.00, for machinists and welder. (Salvaged auto parts used not evaluated).

Assembly weighs 205 lbs.

Construction took place Sept.-Oct., 1941.

First wheel carrier finished Oct. 6, 1941.

The jig and process is not patented.

The basic design was devised by the author, also some modifications suggested by the two machinists who built it.

Factors of Judgment

1. Savings effected—A new wheel

carrier costs \$53.50. The average salvage time is 2 hours' labor at \$1.40 per hour and 2 lbs. of mild steel arc rod at 6 cents per lb. Oxygen and acetylene for the cutting operation was 18 cents. Proportionate cost saving compared to price of new carrier, 94%.

2.a. Estimated annual gross cost saving, \$3,210.00.

To explain: should the number of wheel carriers salvaged thus far (twenty in four months) continue at the same rate, it will mean that we will have to purchase sixty less wheels at the aforementioned gross cost.

b. Any large fleet owner faced with

Tool Losses Zero (Well practically so)

TOOLS keep on getting mysteriously lost in most contractor and highway or street department shops. We're speaking not of the mechanic's own kit, but the special

the same condition, could cut carrier costs at least 50%, bearing in mind that all carriers cannot be salvaged and some must be destroyed to obtain replacement spokes.

Note: Overhead has not been figured as it varies greatly as to locality and circumstances.

3. In these times when replacement parts are difficult or impossible to obtain quickly, salvaging processes must be employed as extensively as possible. It means a saving to the Department or fleet owner, a saving in raw materials and productive man hours that are so vital to our war effort. The useful life and service of parts formerly junked is now greatly extended.

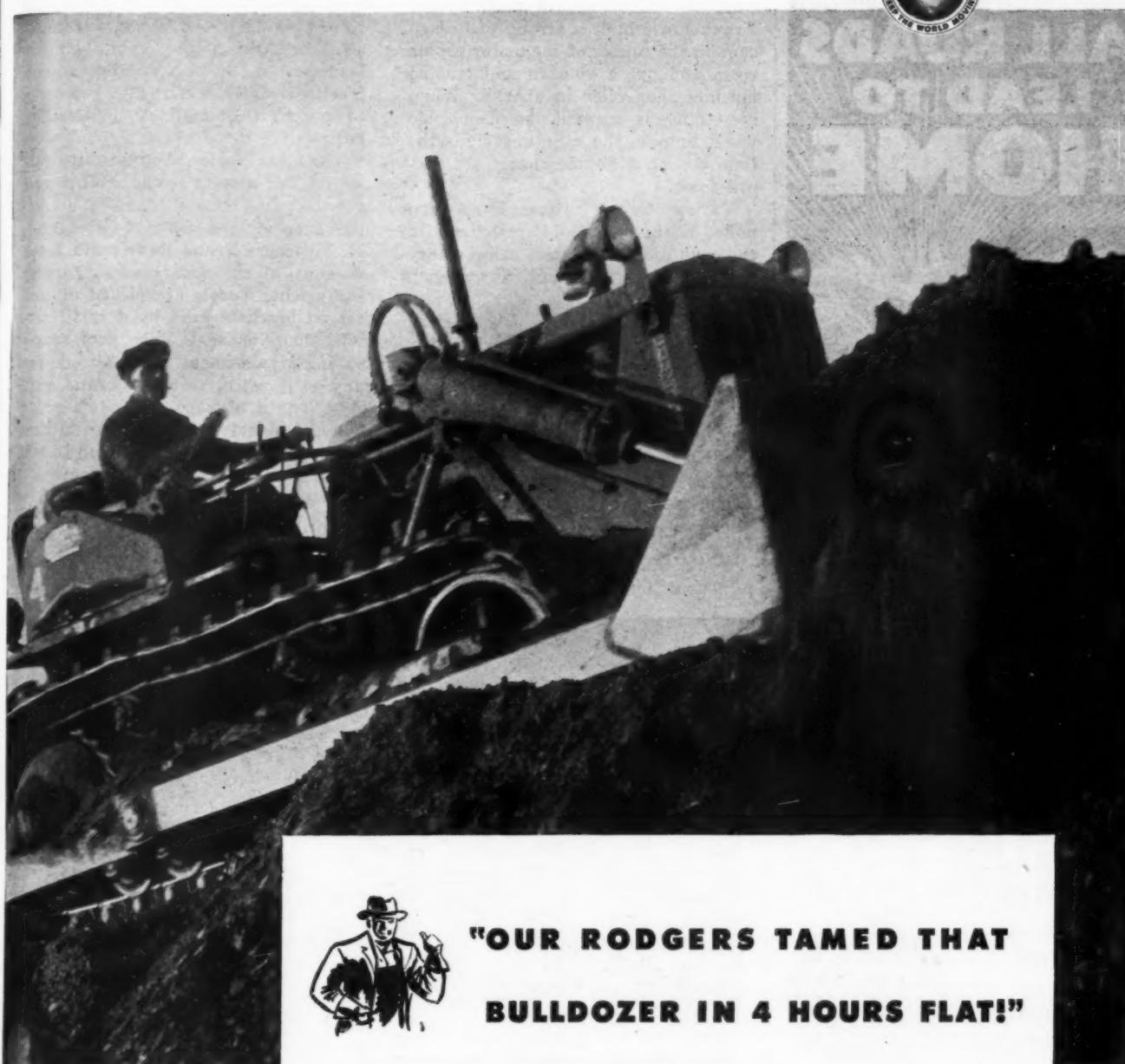
bits and other tools that an establishment of any size must keep on hand.

Many shop organizations are so small that a full-time tool keeper is out of the question, but why not a part-time "watch-dog"? That's the system at the shop and garage of the

Tool cage at Rochester municipal garage



IF IT'S A RODGERS IT'S THE BEST IN HYDRAULICS



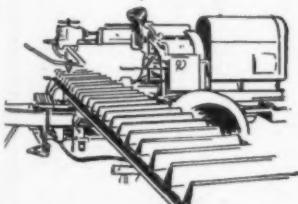
NO. 19 OF A
"READY-WITH-A-RODGERS" SERIES

**"OUR RODGERS TAMED THAT
BULLDOZER IN 4 HOURS FLAT!"**

"The first job our Rodgers Track Press did for us opened our eyes. It was on a bulldozer that needed new track bushings—a job that used to take at least a couple of days.

"In four hours flat, that bulldozer was all fixed up snug and tight with new pins and bushings, ready to go to work. We don't mind track repairs any more—our Rodgers takes 'em all in stride."

This experience is typical—maintenance men agree that the Rodgers Track Press shortens layups for tractor repairs—saves time and money. It will pay you to get the full story on the Rodgers Track Press . . . write or wire for complete information and prices. *If it's a Rodgers, it's the best in hydraulics.* Rodgers Hydraulic, Inc., Dept. C-10, St. Louis Park, Minneapolis 16, Minnesota.



RODGERS HYDRAULIC, Inc.

ROADS AND STREETS, October, 1944

When ALL ROADS LEAD TO HOME



**DIETZ
LANTERNS**

**DIETZ
TORCHES**

An estimated expenditure of \$3,000,000,000 a year, for the first FIVE post war years, will be required for repairing, extension, construction of American highways.

The long burning, ever reliable DIETZ LANTERNS will be called upon to play an important part in supplying proper light and safety.



R.E. DIETZ COMPANY
1840 1944
NEW YORK
Output Distributed Through the
Jobbing Trade Exclusively.

Rochester, N. Y., department of motor equipment. Finding no other way to combat the human tendency to walk off with tools, Superintendent Frank Rowe built a strong padlocked cage in the corner of the motor repair room and put a veteran and trusted machine-shop oiler in charge. When something is wanted, he drops his work, unlocks the cage and signs the item out on a simple charge-out record form.

Various supply items have been added to the books and shelf trays in the cage room, the latest being emery wheels, which are put away each night.

The Rochester shop is a good-sized one, taking care of several hundred items, and the handy tool cage is entirely apart from a large stockroom in another part of the building. But such a tool and time-saving room is feasible in quite small shops.

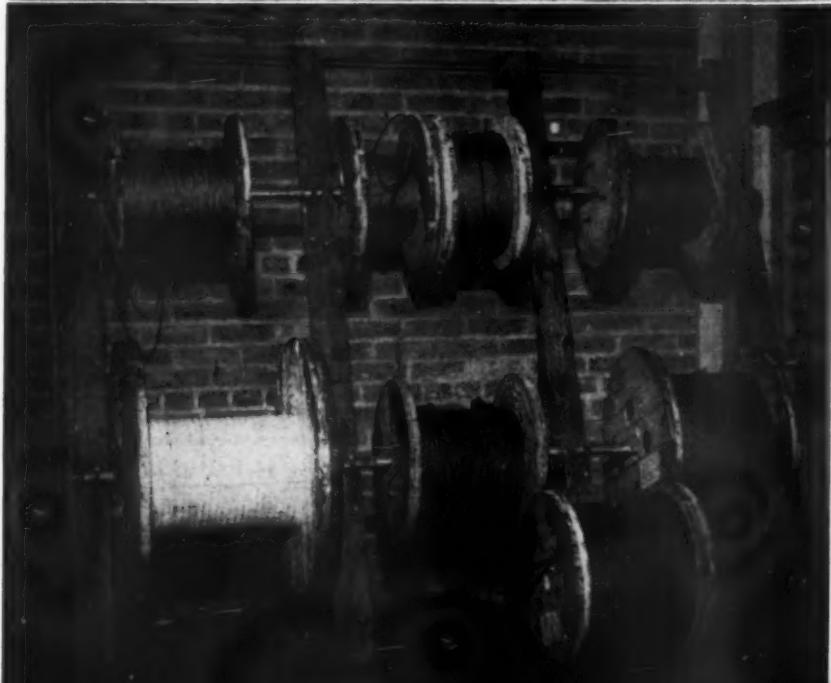
Wire Rope Storage—How and How Not to Do It

You'd think that a contractor who pays out his own good dough for

wire rope would at least see that it is properly stored. Yet this scene, snapped in the yard of a big and successful firm, is all too familiar to Ye Editor as he noses about. It looks as though this pile of cable was unloaded at the home plant by a dump truck driver in a hurry to get home to supper. Dust and rust had already begun their dirty work.

The other photo shows a pretty fair set-up for storing cable. We'll call out the name here—it's at the municipal shop of the City of Rochester, N. Y., where Frank Rowe holds forth as supt. of the department of motor equipment. Spools are picked up and set on brackets here by a small mobile floor crane. This floor-space-saving arrangement would also do for any shop with overhead crane rail. Any length of rope desired is ruled out and quickly measured for cutting by means of distance marks up to 100 ft. painted on the concrete floor.

You may not want to fool with a rack. O.K. But in any event cable should be stored indoors on a clean concrete floor. The little labor needed to do it right will pay big dividends.

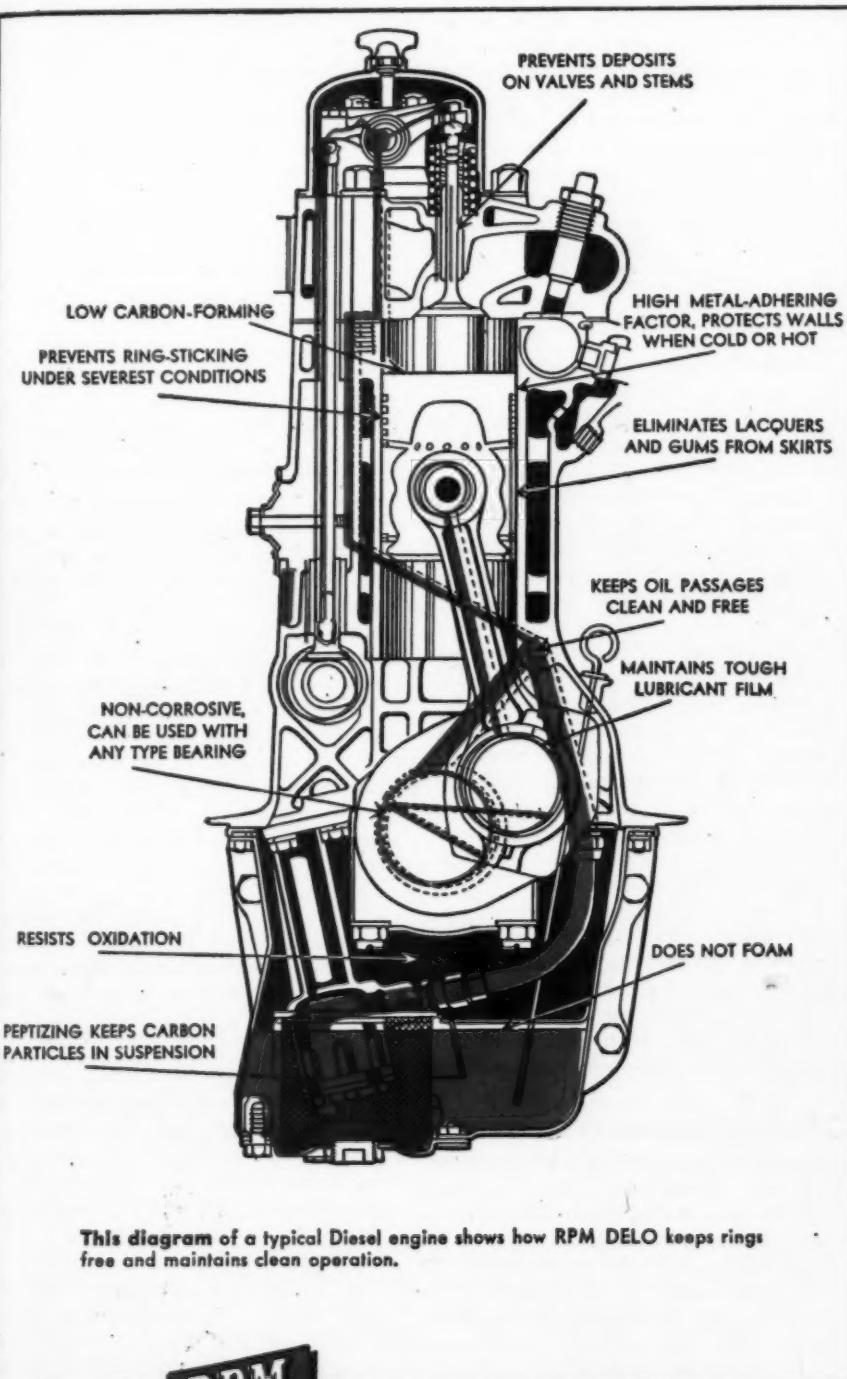


TYPICAL DIESEL LUBRICATION PROBLEMS:

4. Removal of Deposits from Engines

RPM DELO will clean your engine of sludge and other deposits, even in the ring-belt, unless accumulations of carbon, gum, varnish, etc., have cemented rings so tightly that oil cannot get behind them. The following procedure is recommended for purging conventional engine systems:

1. Drain present oil from crankcase while hot.



**RPM
DELO**

2. Renew filter element to trap abrasive particles that may be carried in circulation during purging.
3. Fill crankcase with RPM DELO.
4. Run engine at fast idle for two hours, maintaining water jacket temperature of approximately 200° F. minimum.
5. Drain again while hot and refill with RPM DELO.
6. Place engine in regular service and drain at one-half normal drain period or 750 miles, whichever comes first, for two or three drains. Check oil frequently as removal of deposits may temporarily increase oil consumption.
7. Drain while hot. Check oil filter and replace when necessary.
8. Refill with RPM DELO, returning to regular oil drain and filter change period, and continue to use RPM DELO.

RPM DELO is made from base oils especially selected for non-deposit-forming characteristics, and contains a detergent which keeps foreign particles in suspension. It also contains an anti-oxidant which prevents the formation of gums and lacquers. It is non-corrosive, may be used with any type of bearing.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kysco RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (Concentrate). Ask your Diesel engine manufacturer or distributor for the name of the RPM DELO supplier in your vicinity.



The typical cleanliness of engine parts when RPM DELO is used is illustrated by this oil filter removed from an engine used in heavy duty Diesel bus service for 50,000 miles. Oil pump screen and valve chamber were comparably clean.

STANDARD OF CALIFORNIA

ROADS AND STREETS, October, 1944

Time to Change Over!

It's time for the annual winter change-over. Obvious fact? Sure, but human nature being what it is, these reminders are plenty timely. Pass them along

THIS winter it is more important than ever before that your tractor puts on its suit of long underwear before it pokes its stubby nose in the face of a sub-zero blizzard. This winter the snow removal equipment must be prepared to stand up and take it because when a unit breaks down or a part wears out, there very likely will be no replacements immediately available for repairs.

Highway maintenance equipment must be prepared for winter work just as your automobile is prepared for winter driving. Similarly with your automobile, first attention should be given the cooling and lubricating systems of the machines.

Lubrication "Musts"—Cold weather lubrication in all types of snow removal equipment is very different from summer lubrication. The best rule to follow is the specification of the manufacturer. The crankcase must be drained and refilled, lighter transmission oil must be used and chassis fittings should be shot. When the temperature falls below freezing, and lighter weight oil is not available, heavier oils may be used only if diluted with kerosene.

Lubrication schedules differ with the various types of snow removal equipment. Each machine has a regular lubrication chart and observance of the recommendations will do more to prolong the life of the motor than any other maintenance measure. This is especially true during winter operations when all elements combine to make functioning of the lubricating system more difficult. Always use the right grade and weight of lubricant to meet both climatic and operating requirements as recommended by the manufacturer. Lubricate regularly and on schedule.

Give Radiators a Chance—Radiators should be drained and flushed and, before the anti-freeze solution is used, the water pump, hose connections and cylinder heads checked for leaks. If anti-freeze leaks into an engine, it will contaminate the oil, cause sticky piston rings and probably damage other parts. In a truck engine, an efficient cooling system will maintain a temperature of about 150° F., ensuring economy of operation and minimizing the formation of water and acid vapors in the crankcase. While

the radiator is being checked, look at the manifold heat control. This device conserves fuel by hastening the "warm-up" of the engine. If it is not functioning properly, it should either be replaced or repaired.

Although there are many good anti-freeze preparations normally on the market, the quantity available this winter will be restricted. Many of these solutions have an alcohol base and it is well to remember that alcohol evaporates while the machine is working. Unless operations are on a 24-hour basis to check the gravity of the anti-freeze when the machine comes back into the shop at the end of the shift.

Scrap No-Good Batteries—Motors and batteries take a lot of abuse in cold weather starting. Wherever possible, house the machine in a heated or protected shop. When equipment is left outdoors in freezing weather, a covering of canvas or tarpaulin affords some protection. Condensation of moisture can be prevented by covering the exhaust pipe.

A cold start is difficult enough with a good battery. A poor battery may as well be thrown in the salvage heap. A battery should be kept in good condition and inspected frequently to make sure that it is filled. Continuous cranking should be avoided. Few batteries will stand more than half a minute at a time without permanent damage. If a machine does not start readily, the battery and starter should be allowed to cool before attempting to start again. The motor should not be run at full throttle until the engine has "warmed up" and is running smoothly. About one-third throttle should be used first, and then full throttle until the right temperature is attained.

Thorough Inspection Pays—Of first importance in keeping the machine running throughout the winter months is a really thorough inspection. Engine timing must be correct, spark plugs kept in good condition and electrodes properly spaced. Insulation on wiring should be inspected and brushes and commutator cleaned so that the generator may deliver its full capacity of current.

After the machine itself has been checked and serviced, the snow-plows and wings are due for attention. Plow

controls are either hydraulically or cable controlled, or in combination, although simple enough in themselves are just about the most important single items in the entire snow removal unit. Improperly functioning hydraulic mechanisms or broken cables will prevent the unit from completing its task no matter how smoothly the motor is running. Hydraulic oil should be of proper viscosity. Follow the manufacturer's recommendations. The oil should be changed frequently. The packing on rods must be tight because worn packings will allow the rod to carry dust and dirt into the cylinder. Loose or worn fittings on hydraulic mechanisms should be corrected immediately. The rubber hose should always take a natural curve to prevent unnecessary wear by kinking or rubbing.

Install Good Cables—Cables on snow removal equipment will give good service and may be relied upon to stand up under severe strain in sub-zero temperature if attention is paid to a few simple details. First, a cable of proper size should be used. Too large or too small a rope will ruin both the sheave and the rope.

Because wire ropes on snow removal equipment are faced with severe conditions, it is important to select a wire rope which will resist both strain and temperature. Preformed wire rope is better suited to snow removal equipment than non-preformed. It withstands the battering shock of battling drifts hour after hour and resists the fatigue of critical diameter sheaves which will cause an ordinary rope to deteriorate rapidly.

The life of wire rope on snow removal units may be further extended by lubricating the rope regularly with a good quality lubricant. Although preformed wire rope is supplied with an inner lubrication at the time of manufacture, this needs to be renewed from time to time as operation wears it away.

Prepare your equipment for the task ahead, send the snow removal units out on the highways well equipped to handle the difficult winter maintenance work, and then take care of them with regular inspections and servicings throughout the winter months, and they will see you through.



ALWAYS READY...



An unprepared, unprotected transport in submarine-infested waters would be in for trouble. When roads get icy, highway service crews are in for trouble, too, if untreated stockpiles are frozen — hard to load — hard to spread — slow to act on ice.

Every year more officials stock up early on ice control abrasives, treat them with calcium chloride and cover or store them in sheltered bins. Thus they are "Always Ready" when ice forms, to get quick coverage of fast acting, easy to load, easy to spread abrasives.

Abrasives treated with calcium chloride quickly dig into ice, hold fast and give traction. Such real service to traffic may be supplied with substantial savings in materials, labor and time if you'll use calcium chloride in your ice control grits.

Write for our Bulletin No. 27, "Skidproofing Icy Roads and Streets." It will be sent on request.

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Building • Detroit 26, Michigan

ICE CONTROL WITH
CALCIUM CHLORIDE
FAST • POSITIVE • ECONOMICAL

★ ★ With Road Builders in Uniform ★ ★

From the South Pacific to England and from the Aleutians to Burma you'll find them serving today . . . the thousands of road builders who've gone out from contracting firms, state highway departments, and county, city and federal engineering posts. Here is news of a few of them. More next month. Send us your items!

Richard J. Griffith, before the war was vice-pres. of the J. R. Griffith Co., well known contracting firm of Racine, Wis., is now in India as a 1st Lt. in the Army Engineers.



Lt. Griffith



Major Eidmann

Major O. J. Eidmann, formerly a consulting engineer in Topeka, and previously Engineer of Design for the State Highway Commission of Kansas, has been serving in England for the past three years.

* * *

Lt. L. W. Newcomer, formerly county engineer, Butler County, Kansas, has been in the S.W. Pacific area since May, 1943 as a lieutenant with the Seabees. He was at Bougainville for several months.

First Lt. Earl B. Harris, son of Frank E. Harris, assistant engineer of State Aid Projects, (New Jersey State Highway Department), has been reported killed over Germany following a bombing mission. Lt. Harris, who was a navigator on a B-24 Liberator, had made more than 28 flights over enemy territory. He was employed by the Electrical Division until shortly before his enlistment in 1942.

* * *

Lt. John R. "Dick" Telford, son of J. M. Telford, Lansing equipment dealer, is a prisoner of war in Germany, according to word received by his parents.

More Pennsylvania Highway Dept. Military Absentees

Maurice E. Booger, township engr., Allentown; John B. Shallcross, jr. dist. const. engr., Philadelphia dist., (Major, U. S. Army); Harvey W. Gehr, asst. dist. engr., Indiana dist., (Major); Wm. E. Robison, asst. dist. const. engr., Pittsburgh, (Captain); Gustav A. Paessler, asst. dist. const. engr., Pittsburgh.

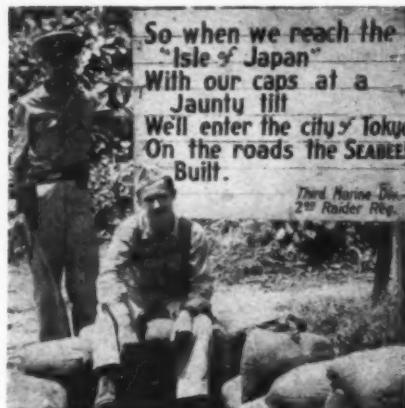
* * *

Reports E. W. Meeker, state highway engineer of S. Dakota:

R. K. Morrell, construction engineer for the S. Dakota state highway department since 1938, is a Captain, Corps of Engineers, stationed at Denver. He has been on various types of defense construction in Wyoming and Kansas.

Charles Rudd, Railroad Relations Engineer with the Highway Department since 1937, is a Major in Army Ordnance, also at Denver.

K. R. Skurr, Lieutenant Colonel, who was our Bridge Engineer since 1933 and connected with the bridge department since 1920, was a Captain, National Guard Unit, 147th Field Artillery, now in the Southwest Pacific.



Lt. Newcomer (standing)

New Equipment and Materials

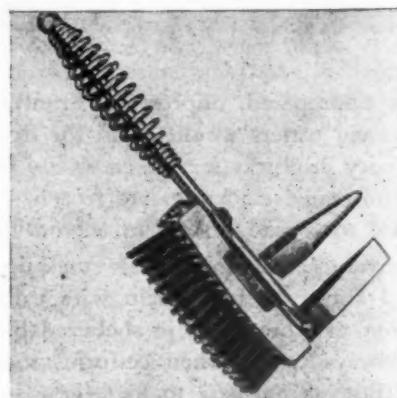
New Rotary Pump

A new, low pressure, rotary pump for pumping all types of liquids having lubricating qualities, has been announced by the John S. Barnes Corporation, Rockford, Ill. The new pump is stated to be adapted for use as a lubricating booster pump for oil lines, a gasoline dispensing pump and for oil pressure systems on automotive, truck or tractor equipment. It has also proven suited for use on torque converters. Capacity of the Barnes pump ranges proportionately from 1 gal. per minute at 600 r.p.m. to 4 gal. per minute at 2400 r.p.m. It has a high volumetric efficiency pumping extremely low viscosity fluids. An outstanding feature of the new pump is the Barnes patented spur gear tooth form. Tooth construction of the

Barnes spur gear is claimed to completely eliminate excessive sliding, and reduce slippage of the fluid to an absolute minimum; each tooth completely fills the mating space, as the gears mesh, and perfect sealing action is effected. Thus positive displacement of the fluid is assured despite variation in fluid viscosity or other factors.

Weld Cleaning Tool

A weld cleaning tool, combining wire bristle brush and slag removing head in one unit, has been put on the market by the Atlas Welding Accessories Co., 14824 Wyoming Ave., Detroit 21, Mich. The tool features an improved brush holder which permits removal of brush for reversing or replacement by inserting screwdriver at rear end of holder. Up and out-



Atlas Model A Dual-Tool

ward pry releases tension. Brush pops out. Reverse action for inserting and brush snaps in to a firm, rigid seat. Flex-O type spring steel handgrip permanently welded to handle eliminates possibility of loosening or breaking. Chipping head is hand-forged tool steel. Every part of this tool is replaceable, including cone and chisel heads.



New D4 P.C.U. Auxiliary Drum

New Power Control Unit Auxiliary Drum

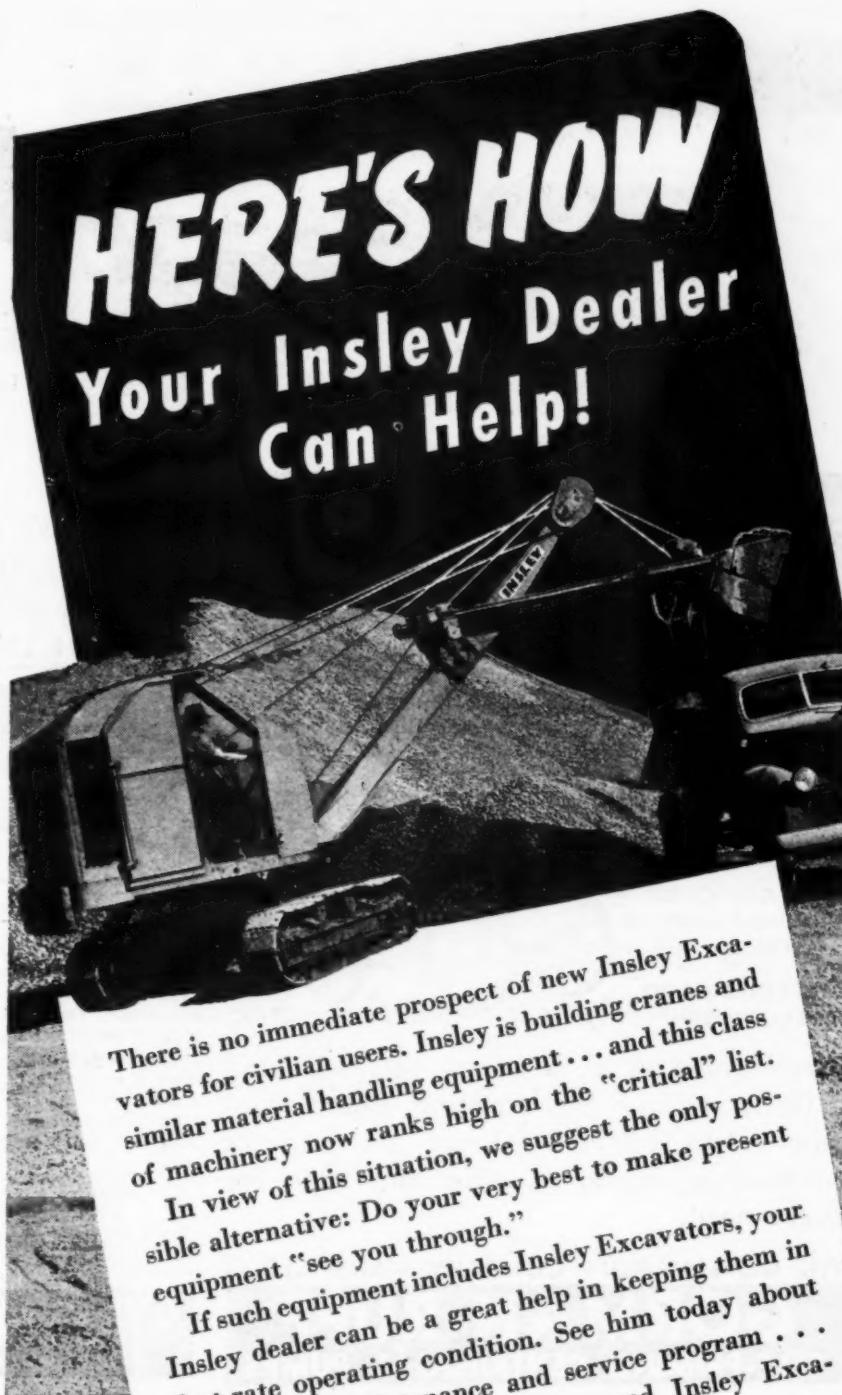
The Hyster Co., Portland, Ore., and Peoria, Ill., has announced a new power control unit auxiliary drum for use with the D4 towing winch made exclusively for the "Caterpillar" D4 tractor. The new unit, while designed as a bulldozer power control unit, provides many additional hoisting and towing services with the "Caterpillar" D4 or R4 tractor. It is simple, quick acting and with only one lubricating fitting.

New Traffic Signs

A method for making light-polarizing traffic signs that are visible to night-driving motorists only when they are using the wrong headlights is the subject of a patent which has been issued to Polaroid Corporation, Cambridge, 39, Mass. The traffic signs are designed for automobiles fitted with both a polarizing headlight system for country driving and an ordinary headlight system for city driving. The warnings, "Shift to polarized beam" and "Shift to unpolarized beam" would be visible to the driver when he uses the wrong headlight system required for the area in which he is driving. However, the warnings would be invisible when he uses the right system.

Large Size Tires Made of Synthetic Rubber and Rayon

The Goodyear Tire and Rubber Co. has gone into production of off-the-road tires with synthetic rubber and rayon. Introduction of synthetic rubber content arises out of government regulations due to the shortage of crude rubber. Use of rayon, it is claimed, will provide greater resistance to bruising and offers greater service possibilities than otherwise. Previously rayon fabric was used only to a limited extent and in specialized



There is no immediate prospect of new Insley Excavators for civilian users. Insley is building cranes and similar material handling equipment . . . and this class of machinery now ranks high on the "critical" list.

In view of this situation, we suggest the only possible alternative: Do your very best to make present equipment "see you through."

If such equipment includes Insley Excavators, your Insley dealer can be a great help in keeping them in first-rate operating condition. See him today about your Insley maintenance and service program . . . and about those new and improved Insley Excavators that await you tomorrow.





LA CROSSE MODEL DF4-14

"As Sturdy as the Hills"

LIKE OLE MAN RIVER, LET'S KEEP
ROLLIN' ALONG AND BUY MORE
BONDS EVERY MONTH

LA CROSSE TRAILER &
EQUIPMENT COMPANY
LA CROSSE - WISCONSIN

Streamlined Inside
for Higher Efficiency and
Lower Operating Costs

RUGGED SIMPLICITY OF DESIGN ELIMINATES RECIRCULATION — NEVER LOSES PRIME REQUIRES LITTLE ATTENTION

DELIVERS GREATER VOLUME PER GAL. OF GAS CLOSE COUPLED TO MOTOR

NO ORIFICE OR PRIMING VALVES TO CLOG OR JAM

CAPACITIES UP TO 125,000 GPH GAS OR ELECTRIC

Streamlined where it counts, you can't clog a Gorman-Rupp Self-Priming Pump. Unparalleled in rugged efficiency, gallonage or continuous hours. A size and type for every need.

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GORMAN-RUPP
SELF-PRIMING CENTRIFUGAL PUMPS

RAPIDITY!
UNIFORMITY!
SATISFACTORY!

Contraction joints **MUST** or should be installed within the "opportune" limited time of ten minutes; this requires speed and proper machinery. All Engineers know how disastrous it is to work concrete too wet or too dry.

"FLEX-PLANE" mechanical joint installers for all types of joints—ribbon, premoulded, poured, cork, rubber, etc.

Ask for Bulletin E-11; it "portrays" other things you know!

FLEXIBLE ROAD JOINT MACHINE COMPANY
WARREN, OHIO, U. S. A.



With its greater safety, due to its deflective action, the TUTHILL Guard Rail is a safe guidepost to follow in your plans for Tomorrow's Highways. It meets the need for faster speeds. Mounted on brackets bolted low on strong posts, the convexed steel guards resist impact, deflect speeding cars and are easy and economical to maintain. *Embody TUTHILL in your specifications for post-war highways. (Available now for maintenance and repairs.)*

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Los Angeles, Calif.

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14 Cu. Yd. 8' Lift

FRONT END SHOVELS
for Industrial Tractors
Write for Catalog

Elkhart White Mfg. Co., Indiana

cases. In making the changeover to synthetic rubber for large size tires for equipment on off-the-road jobs such as earth and rock moving and logging, Goodyear has engineered the internal construction to get the best balance from synthetic rubber and rayon fabric. The placement of the crude rubber is stated to be so distributed throughout the tire that the greatest advantage possible is obtained. The government has authorized manufacture of off-the-road tires using approximately 35 per cent synthetic rubber and 65 per cent natural rubber. This construction is designated as "S-7."

New Blade Maintainer

A recent addition to the line of Trojan road tools of the Contractors Machinery Co., Batavia, N. Y., is a center blade maintainer for use especially as an attachment to International Harvester Tractors H and M. It is stated that this maintainer



Center blade maintainer

may be attached to the tractor in two hours. There are no holes to drill, nor special tools required. All blade movements are controlled by the operator from the seat of the tractor. The blade length is 9 ft., height 14 in., and thickness $\frac{5}{8}$ in. The cutting edge (renewable) is $\frac{1}{2}$ by 6 in., the ground clearance 2 in. and the penetration 3 in. The weight of the maintainer unit is 1750 lb.

New Front End Loader

A new front end loader for application to International I-6 and ID-6* tractors has been announced by the White Manufacturing Co., Elkhart, Ind. This latest addition to the line of White loaders for wheel-type tractors embodies the features of extensible booms and mechanical power take-off from front of tractor engine. The extensible boom arrangement is exclusive with White loaders. It places bucket close to tractor when digging, but when bucket is raised it moves outward, as well as upward, and discharges 2 ft. ahead of digging position. This permits loading into high standard trucks and spreading

THIS IS THE PUNISHMENT STSALKRAFT IS TAKING IN WAR SERVICE!



PUT STSALKRAFT FIRST ON YOUR POSTWAR LIST!

Normally used for concrete curing, SISALKRAFT is protecting deckloads of war supplies exposed to arctic ice and tropical humidity — to sleet, snow, rain, wind and dirt!

Can you think of a more severe test than this direct exposure to the elements and the rough, hurried handling that war supplies must take?

Those very same properties that enable SISALKRAFT to protect war supplies are the ones you need for protecting newly poured concrete from rapid evaporation and from damage by frost, drip and debris.



Put SISALKRAFT first on your postwar list — for concrete curing and general job protection. Its low cost, long life and outstanding performance are a record of nearly 25 years of satisfactory service.



Manufacturers of SISALKRAFT, FIBRENE, SISAL-X,
SISALTAPE and COPPER-ARMORED SISALKRAFT

TROJAN

**SELF
POWERED**



**SPEED
TAMPER**

**THREE-WHEEL MODEL GIVES
EIGHT FEET TAMPING WIDTH IN ONE PASS**

Extra width, higher speed and greater maneuverability because of its short turning radius are the reasons why contractors say, "We do more work at less cost and obtain greater compaction than is possible with drawn tampers." The work performed meets the most rigid Government Inspection and State Highway requirements.

CONTRACTORS MACHINERY COMPANY, INC.
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Represented by The International Harvester Industrial Dealer
in Your Community



TROJAN ROAD TOOLS INCLUDE: PATROLS, SELF-POWERED SPEED TAMPERS, DRAWN TAMPING ROLLERS, SCRAPERS

THE
COMPLETE
LINE

Erie builds all types of buckets in various weights and capacities to meet the job and operating conditions. Choose the correct bucket for the job and you get the maximum speed and output. Write for broadside on the complete Erie line of buckets



ERIE STEEL CONSTRUCTION CO. - ERIE, PA.
Aggrometers • Buckets • Concrete Plants • Traveling Cranes



New front end loader

of material without hand shoveling. The bucket can be held or dumped at any point in its lift. It can also be removed and a bulldozer blade attached. Option is given of $\frac{1}{3}$, $\frac{1}{2}$ or $\frac{2}{3}$ cu. yd. capacity buckets. A $\frac{3}{4}$ cu. yd. bucket is available for light materials such as snow, coal or light chemicals. In addition to new loader for the I-6 tractors, the White loader is also made for International No. 20 and I-30 tractors already in service. It is also furnished for Case tractor models CI and DI, and for Minneapolis-Moline UTI.

Ultra Sensitive, High Precision Barometer, Altimeter

High sensitivity and precision are combined in two new instruments, a barometer and an altimeter, recently developed by Wallace & Tiernan Products, Inc., Belleville, N. J. They are claimed to be ideally suited for use in surveying and meteorology for airport service, for research work, and as a standard for calibrating other instruments. The instruments have a sensitivity of one part in 8,000, and an accuracy of ± 0.1 per cent. A pointer, moving over a mirrored 5 in. dial, makes practically two revolutions in traversing the full scale-range. This is equivalent to a linear scale of approximately 29 in., and permits scale-reading to 1-ft. altitude or 0.05 millibars pressure. The barometer is normally furnished with 0.5 millibar graduations over a range of 750 to 1065 millibars. The altimeter is normally furnished in either a 7,000- or 15,000-ft. range with 10- and 20-ft. graduations, respectively. Other scales and scale-ranges can be supplied to meet special conditions. Inherent temperature compensation of the instruments is extremely high, so that no special compensating elements are necessary. On the altimeter, for example, deviation is less than 0.1 ft. per deg. F. temperature change up to 7,000 ft. The instrument is thus particularly suitable for work involving instantaneous readings over wide ranges of temperature and pressure. Because of absence of

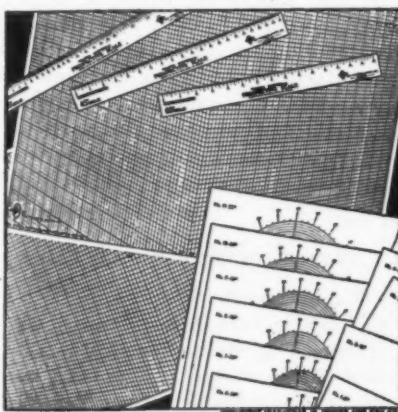


New Instrument of Wallace & Tiernan Products

friction, tapping of the dial is unnecessary when taking a series of readings. Drift of the pointer with time is also negligible. Unique simplicity of design helps the instruments to hold their accuracy under severe usage conditions. For portable service, they are available in shock-proof protective cases. They can also be furnished for wall or panel mounting. A technical publication, giving specifications, is available on request. Availability is currently limited to essential applications for which a high priority can be obtained.

Perspective Drawing Aid

A line of perspective drawing instruments has been brought out by Chas. W. Downs and Son Co., 2280 14th St., Detroit 16, Mich. These Truper products were developed to answer the current need for instruments which would enable the average good draftsman to make accurate perspective drawings. Included in the



Truper perspective drawing aid

line are a wide variety of perspective graphs which permit the artist to show his subject at any chosen angle. There is also a set of true perspective

A COMPLETELY SELF-CONTAINED PORTABLE MIXING UNIT FOR HANDLING COLD MIX MATERIALS



BUILT IN
4 SIZES—
for 600 to
2500 lb.
BATCHES



FLUIDOMETER
Automatic Metering System—
saves time, materials, insures
accuracy and uniformity. For
all types of plants.

For handling cut back, emulsion or similar cold mix materials, this H & B Model "M" portable mixing plant requires no additional equipment except a storage tank for the bituminous materials. The plant is furnished complete with folding elevator, weighing equipment, pug mill mixer, pump and power unit. Separate batch weighing of aggregate and asphalt insures accurate and uniform mixtures. All controls conveniently located for one-man operation. Bulletin M-44 will be sent on request. Also built in semi-portable type, without wheels (Model C). Bulletin C-44.

HETHERINGTON & BERNER Inc.
721 Kentucky Avenue • Indianapolis 7, Indiana



Hetherington & Berner

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CRUSHING, SCREENING and WASHING UNITS

- Up to 2000 Tons a Day •
- Crushers
- Elevators
- Sweepers
- Screens
- Wash Boxes
- Bins
- Pulverizers
- Feeders
- Spreaders
- Kettles
- Conveyors
- Drag-Lines
- "GAYCO"
- Centrifugal
- Air Separators

UNIVERSAL ROAD MACHINERY CO.

Kingston, N. Y.

Canadian Representatives: F. H. Hopkins & Co. Ltd.
340 Canada Cement Co. Montreal Quebec, Can



VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan illustrated CATALOG today.

VULCAN TOOL MFG. CO.

QUINCY, MASS.



"I'M SURE GLAD I PICKED HERCULES!"

"My fleet of Hercules Dumps has had a real workout the past few years, but every job has come through with colors flying.

It's really surprising how seldom Hercules bodies need service or repairs, and when they do, my Hercules distributor is right on the job.

My drivers like Hercules Hydraulic Hoists because of their ample reserve power, their dependability, and their "button-ease" dash controls, with no levers in the cab.

That Hercules slogan, "Men like to say they use them", certainly applies to me!"

Write us, or see the nearest Hercules Distributor regarding the Dump Bodies or Hoists you need now.

HERCULES STEEL PRODUCTS COMPANY
GALION, OHIO

South Bend
GUTTER-SNIPE
PICK-UP STREET SWEEPERS

STREET FLUSHERS
STREET SPRINKLERS
BITUMINOUS DISTRIBUTORS
BITUMINOUS MAINTENANCE UNITS

Since 1908

MUNICIPAL SUPPLY COMPANY - SOUTH BEND 23, INDIANA



Aeroil **Heet-Master**
HEATS AND MELTS **ASPHALT**

TWICE AS FAST

The ONLY insulated tube fired kettle with a completely removable heating unit (for quick and easy cleaning). The ONLY kettle with the burner INSIDE. Now available on pneumatics (and with mud guards too at slight extra cost) on high priority orders. Send for FREE Bulletin No. 260HR. For paying tools and accessories write for Leaflet No. 501RS.

AEROIL BURNER CO., INC.
WEST NEW YORK, N. J.
Chicago San Francisco Dallas

circles—not ellipses—which avoid the distortion usually found where ellipses or free-hand circles are used. Perspective scales, showing diminishing units of measurement as they recede toward the vanishing point at the designated angles, are another item. In each case all lines are located mathematically to insure the highest possible degree of accuracy. All instruments are stated to be accurate at any scale, angle, or visual distance.

Slide Rule Device for Calculating Form Lumber

A calculator for estimating the amount and size of plywood studs and walls needed for any plywood concrete form has been developed recently. It is only necessary to know the rate of pour, whether vibrated or unvibrated, and, of course, the height, length and thickness of the wall. Given this information, any contractor, lumber estimator, architect, engineer or construction supervisor can in a few minutes and with one setting of this slide rule device not only arrive at an accurate estimate of the material needed to construct the forms, but also save much labor in looking up formulas and in figuring. The calculator was designed by Hal Keely, president of the National Plywood Distributors Association, Inc., and chairman of the Research Committee. It is available from that association, at 111 W. Washington St., Chicago, for \$1.

Brake Block for Heavy Duty

Developed when the Army Air Forces called for a brake lining capable of stopping its heaviest bombers, the "1942" brake block, manufactured by The Raybestos Division, Bridgeport, Conn., will shortly be available for civilian use. This brake block is manufactured by a unique patented process which is claimed to result in a product of unusual structure with a very high density, exceptional wear, temperature resistance and stability.

New Precision Punch Press

Combining the features of the "V" way vise and the gap style press manufactured by Reimuller Brothers Co., 9400 Belmont Ave., Franklin Park, Ill., is a new precision bench press of semi-steel construction. Incorporating "V" ways to eliminate the use of die shoes, the new press is designed for a more speedy and efficient handling of many production jobs. It is made in one size, 5-ton, and has a 5 x 6 in. platen with 7 in. of ram movement.

CORONACH

*"Of those immortal dead who
live again
In minds made better by their
presence."*

JOHN L. TOWERS, for the past 21 years civil engineer with the State Highway Department of Illinois, died Sept. 17, aged 43 years. He entered the employ of the department in 1923 and in 1935 was transferred to the traffic section of the Bureau of Maintenance.

ADDISON MILLER, president of Addison Miller, Inc., contractors, St. Paul, Minn., died Sept. 7, aged 58. His company has engaged extensively in the construction of railroads, dams and war projects.

CARLES E. J. MODJESKI, son of the late Ralph Modjeski, the famous bridge engineer, died Sept. 27, aged 48. He was graduated from Cornell University in 1918, and was associated with his father in bridge design and construction for many years.

WALTER D. LOVELL, consulting engineer and contractor of St. Paul, Minn., died recently. He was 78 years old.

JAMES P. O'KEEFE of James P. O'Keefe Co., paving contractors, Chicago, Ill., died Sept. 9, aged 63.

HOWARD C. IVES, author of civil engineering, and a former professor, died Oct. 6, aged 66. He was graduated from Sheffield Scientific School at Yale in 1900 with degree in civil engineering and took a position as instructor in that subject at Worcester Polytechnic Institute, going from there to University of Pennsylvania in 1903 and returning in 1906 to remain in Worcester until 1925. Since 1925 he has been a consultant in civil engineering.

HENRY L. DEMING, for the past three years managing director of the New York State Highway Chapter of AGC died Sept. 13, aged 57. He had been affiliated with the construction industry for many years.

HARWOOD FROST, son of George Frost, founder of *Engineering News*, died Sept. 22 in Chicago. At one time he was head of the Book Department of the *Engineering News Publishing Co.*



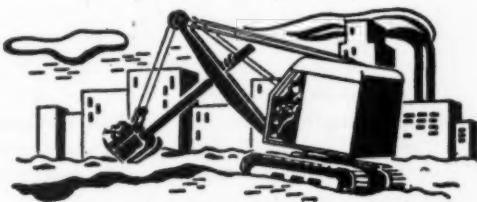
Raising a BLISTER—

Osgood Dependability Helps Speed Construction on Military Hangars

"Somewhere in England" this blister-type hangar is affording weather protection for the men and materials of our engineer troops. And in the foreground is a construction "warhorse" familiar to Army engineers the world over . . . a dependable Osgood shovel.

Whatever and wherever the job — slogging through mud . . . chipping a runway in the flint-like coral of Pacific atolls . . . hacking a road out of African jungles . . . battling the frozen ground along the Alaskan Highway . . . plugging away at the common place jobs here at home — rugged, powerful Osgoods are giving memorable wartime performance.

This global service, besides helping to win the war, is an exhaustive proving ground for better peacetime excavating equipment for you.



THE
GENERAL
EXCAVATOR COMPANY
CRANES, DRAGLINES
AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company
OSGOOD
THE OSGOOD COMPANY • MARION, OHIO

OSGOOD
SHOVELS, DRAGLINES
CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

ASPHALT

for all purposes

Prompt Shipments Ample Facilities
Inquiries Solicited

**Talco Asphalt & Refining Division of
Southport Petroleum Company**

New York 17, N. Y. Dallas, Texas
155 East 44th Street Magnolia Bldg.
Telephone—Murray Hill 2-2088

PORTABLE ASPHALT PLANTS

High Production—Low Cost



THE McCARTER IRON WORKS, INC.
NORRISTOWN, **PENNA.**

HOW FLINK *Self-Feeding* SPREADER DOES SEAL COATING BETTER

Spreads an even layer of material, thick or thin—as desired, as the truck is backed up . . . thus avoiding damage to tires or leaving tracks of oil. Spreads full width of street. Does it faster, smoother with less help.



Flink self-feeding material spreaders save time, materials and reduces accidents. They have been proved in tough road construction and maintenance jobs all over the country.

Faster. Operated by driver from cab who can throw spreader in and out of action as he approaches or leaves area to be spread.

No helper. Raising the dump truck caused load to fall toward spreader. This plus positive agitation eliminates man on back.

Flink Spreaders. Are ideal for all types of road and street spreading, for ice and dust control, for spreading agricultural limestone.

The FLINK COMPANY

508 VERMILION, STREATOR, ILLINOIS

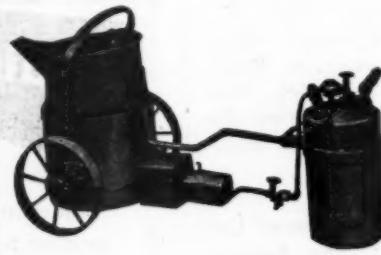
ROADS AND STREETS, October, 1944

CONNERY'S HEATING KETTLE

*For speedy
heating of
tar and
asphalt—*



Use this CONNERY oil-burning Patrol Patching Heater on the small job and this CONNERY oil-burning kettle for large-quantity production.



Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring sets, etc.

CONNERY CONSTRUCTION CO.
3900 North Second St. Philadelphia, Pa.

LIFT with UNIT Mobile Crane

A single engine supplies both mobility and lifting power, with easy one-man operation. All main machinery fully enclosed in a one-piece cast gear case. Ask for complete data.

UNIVERSAL UNIT MACHINERY CORP., Milwaukee 14, Wis.

A 4303-1/8

Buy

**More
BONDS!**

With the Manufacturers

W. K. Cox Promoted by Caterpillar

W. K. Cox has been advanced to the position of assistant general sales manager of Caterpillar Tractor Co., Peoria, Ill. Mr. Cox joined the company in 1928 as a special representative on logging sales, moving on to industrial and general sales work in 1932. In 1936



W. K. Cox

he was assigned to the advertising department, returning to sales a year later, as assistant manager of the Sales Development Division. In 1941 he was appointed assistant sales manager of the Eastern Division, becoming manager of that division in 1943. During the early part of the war he spent one year as manager of the newly-formed expediting division, a unit set up to speed the delivery of purchased raw materials. William S. Ziegler, with the company as a field representative since 1929, was made assistant sales manager of the Eastern Sales Division early in 1944, and is now appointed to the position of sales manager of that division. F. D. Habekorn, the company's representative in Texas and Oklahoma, has been appointed assistant sales manager of the Eastern Division.

W. F. Avery Elected Secretary B. F. Goodrich

Willis F. Avery, assistant secretary of The B. F. Goodrich Co. since 1936, was elected secretary of the company at a meeting of the Board of Directors held Sept. 19. He succeeds the late Shelby M. Jett, secretary since 1927, who died Aug. 9. The company's patent and legal departments will be under his direction. He has been with B. F. Goodrich since 1924.

K. W. Freeman Appointed District Manager for International Harvester

W. C. Schumacher, manager of sales, Motor Truck Division, International Harvester Co., has announced the appointment of Karl W. Freeman as southern district manager. Prior to his new appointment, Mr. Freeman was the company's branch manager

ROLLING RUNWAYS TO TOKYO!!



Vital to every advance on the road to Tokyo are the airfields with their runways made carpet-smooth with American equipment.

Prominent in the preparation of these runways are Buffalo Springfield rollers . . . the same rollers that will again serve in peacetime.

BUFFALO SPRINGFIELD ROLLERS

THE BUFFALO SPRINGFIELD
ROLLER COMPANY
SPRINGFIELD, OHIO, U. S. A.

at Atlanta, Ga. His service with Harvester began at Des Moines, Ia., in 1925. Since that time he has served at the Council Bluffs, Amarillo, and San Antonio branches.

E. J. Head Promoted

Universal Atlas Cement Co., United States Steel Corporation Subsidiary, has announced the appointment of Edward J. Head, assistant sales manager, as sales manager in New York, and the appointment of Foster A. Hagan as assistant sales manager, New York.

Bill Mercer Returns to Robins

William B. Mercer is back with Robins Conveyors, Inc., again. In the fall of 1942, he was loaned to the War Production Board, Material Handling Division, where he was chief in charge of the conveyor and mechanical power transmission equipment section. Now he comes back to the Boston office where he again will handle sales of Robins materials handling machinery, sharing the New England territory with J. F. Donahue who is in charge of Mead-Morrison Division sales.



NATIONAL GUNITE Pressure-Packed CONCRETE

has superior
advantages:

Low water ratio assures
density at all points—no
voids, no bubbles or air
pockets . . . Waterproof
—perfect steel protection.

...Greater strength with less thickness...
No waste of material . . . Great savings in
time.

Recommended for rebuilding or relining
disintegrated concrete and steel as well as
new work.

National Gunite is a coast-to-coast engi-
neering organization with years of ex-
perience, supplemented by field crews of
skilled Gunite operators.

Write, giving your requirements

**NATIONAL
GUNITE
CORPORATION**

420 Lexington Ave., New York 17, N. Y.
Boston Washington

Shunk *Snow
Plow
and Ice Removal
BLADES*

Proved record
of superior performance.
Made of specially developed
steel to withstand severe
service conditions.

FOR ALL TYPES AND MODELS
OF SNOW PLOWS
Various widths, lengths, thick-
nesses—flat or curved—stand-
ard or special—punched ready
to fit your machine.

SHUNK SAW-TOOTH
ICE BLADE
Amazingly effective. Thoroughly breaks up and removes
heavy, slippery ice and snow
formations. Replaces all types
of snow plow blades or main-
tenance units. Write for Bulle-
tin and name of nearest
Distributor.



Shunk
MANUFACTURING
COMPANY
ESTABLISHED 1854
BUCKYRUS, OHIO

Executive Personnel Changes by Hyster

Several important executive personnel changes within the organization have been announced by the Hyster Co., Portland, Ore., and Peoria, Ill. These changes are in line with broad planning for their sales department. Philip S. Hill, who has been assistant manager of the Eastern Division at Peoria, returns to Portland as General Sales Manager. Previous to his Peoria position, Hill was manager of the Washington, D. C., office, a district representative covering the central United States and Canada, and held various sales positions dating back to 1933 when he first started at Hyster. Glen M. Ede becomes Assistant Manager of the Hyster Industrial Truck Division. In eight years as general purchasing agent for the company, Ede made valuable contacts all over the United States and is familiar with truck markets and sales. C. D. Bamberg, formerly assistant purchasing agent for four years, has been made Purchasing Agent. He has been with the company since 1937 when he started in their Cost Department. B. G. Nordling has been made Manager of the Parts Department. Nordling has been associated with Hyster for four years during which time his work has been almost entirely in the Parts Department.



P. S. Hill



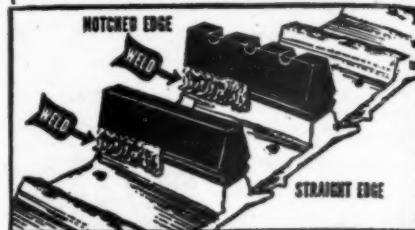
G. M. Ede

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Fegley Resigns as Sales Manager of Shunk Mfg. Co.

Gale H. Fegley terminated 26 years of service with Shunk Manufacturing Co., Bucyrus, O., when his resignation as sales manager was presented Sept. 7. His experience in the construction equipment blade industry brought his appointment to the advisory committee of the war production board in Washington. With no immediate plans for the future, Mr. Fegley will go to the Pacific Coast to be present at the christening of the Victory ship Bucyrus, for which his daughter, Marine Sgt. Eleanor A. Fegley, will be sponsor.

Rebuild your
TRACTOR GROUSERS
WITH **BULLDOG**
Grip-Lugs



Easily Welded

Other Products
Trak-Link Re-Nu Plates
Mango Bars for Repointing
Digger Teeth
Excelloy Overlay Metal
Send for Folder R-2.

ALLIED STEEL PRODUCTS, Inc.

N. B. C. Bldg.,
Cleveland 14, Ohio

THE CONNECTICUT WAY



Whether it's spreading material for resurfacing roads or for ice control, the Burch Chip-It-Over will do a perfect job and, at a big saving in time and money.

Chip-It-Over can be used with any dump truck and can be put on the truck ready to operate, or removed from the truck in FIVE minutes. No "gadgets" to attach to truck.

Manufactured by
The BURCH CORPORATION

Crestline, Ohio

Equipment Since 1875

BUY BONDS and MORE BONDS

To Keep Abreast of Official Highway Progress

You are invited to subscribe to "American Highways," the official publication of the American Association of State Highway Officials. Published quarterly, this periodical reports the meetings and the transactions of the organization. \$1.00 for yearly subscription in the United States; \$1.50 for yearly subscription in foreign countries; or \$.50 per copy.

You should keep informed on the workings of this organization to keep abreast of highway progress.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS

1218 National Press Building
Washington, D. C.

Worthington Appoints W. J. Van Vleck Manager Atlanta District Office

Worthington Pump and Machinery Corporation has announced the appointment of William J. Van Vleck as manager of its Atlanta office, succeeding Edw. Stauverman, who, after many years of association with Worthington, has resigned to engage in another line of business. Mr. Van Vleck entered Worthington's employ in 1924 as a member of the student group. Since 1938 he has been assistant manager of the Philadelphia District Office. Prior to that assignment he was application and field service engineer in the same district.



W. J. Van Vleck
with the new
SYNTRON
GASOLINE HAMMER
PAVING
BREAKER

New Distributors for Pioneer

Pioneer Engineering Works, Inc., Minneapolis, Minn., has announced the appointment of the Anderson Engineering Co., Cambridge, Mass., to represent them in the States of Maine, New Hampshire, Vermont, and Rhode Island, and Massachusetts excepting the four western counties. They also have announced the appointment of the Tyler Equipment Corporation, Springfield, Mass., to represent them in the State of Connecticut (with the exception of Fairfield County)—and in the four western counties of Massachusetts.

New Distributors for Foote Co.

The Power Equipment Co. 601 E. 18th Ave., Denver, Colo., is representing the Foote Co. in the state of Colorado. The Bode-Finn Co., 1654 Central Ave., Cincinnati 14, O., is representing them in Ohio. They are handling the Adnum black top paver and the Multifoote paver.

Appointments by Philip Carey

Three appointments to executive positions in the sales and advertising departments of The Philip Carey Manufacturing Co. have been announced by E. W. (Pat) Smith, vice-president and general sales manager. Harold D. Bates has been named advertising and sales promotion manager. Chester L. Owens has been named assistant general sales manager. George B. Johnston, who becomes general merchandising manager, was formerly manager of the Marketing Division. All three men will make their headquarters at the company's Cincinnati office.



**POWER
TO SPARE**
with the new
SYNTRON
GASOLINE HAMMER
PAVING
BREAKER

100% Self-Contained
No Air Compressor and Hose
No Battery Box and Cable
— No Springs —

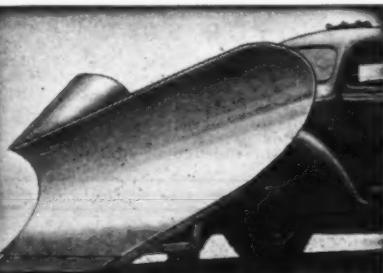
**SAVE—
TIME
LABOR
MONEY!**

**Busting Concrete
Breaking Rock
Cutting Asphalt
Digging Shale—Frozen
Ground—and other jobs.**


**POWER!
POWER!
POWER!
to spare**

*Write for
illustrated folder*

SYNTRON CO.
384 Lexington
Homer City, Pa.



ROOT INTERCHANGEABLE SNOW PLOWS

Highway Commissioners, Road Engineers and Supervisors of road maintenance prefer Root Interchangeable Snow Plows for opening up streets, highways and airport runways, removing barriers of snow and ice. Get the facts, investigate maintenance costs ... you'll understand the reason why Root plow units "get the nod" when purchasing decision is made by those charged with snow removal in the road, street and airport field.

Write for Bulletin

ROOT SPRING SCRAPER CO.

Kalamazoo II, Michigan

*Builders of road maintenance
equipment since 1890*

Clearing House

FOR SALE

TRANSITS and LEVELS



New or Rebuilt Sale or Rent

Headquarters for
REPAIRS — any make.
Factory Service. We will
also buy your old in-
struments or take them in trade.

A complete line of Engineering
Instruments and Equipment for Field
or Office. Write for Bulletin RS-10.

WARREN-KNIGHT CO.

Manufacturers of *Sterling Transits and Levels*
136 N. 12th St. Philadelphia 7, Penna.

FOR SALE

Shovels—Cranes—Draglines

Lorain 79 Diesel Comb.
Lorain 75B and 75A gas.
55 Lorain Comb.
No. 7 Northwest, high gantry, extra long
carts.
Lima 301 Dragline.
Bucyrus-Erie 50B steam 2 yd.
Marion Model 21 steam.
301 Koehring combination.
37B Bucyrus-Erie.
43B Bucyrus-Erie.
150 P & H Truck Crane.
P & H 16-wheel truck crane.

Caterpillar Tractors

D8 with 30 yd. LaPlante-Cheate Scraper.
D7 with LaPlante-Cheate Angledozer
and 3-yd. Carryall Scraper.
RD8 with LeTourneau Angledozer.
60 with LeTourneau-Cheate Dozer.
50 gas with Euclid Hydraulic Bulldozer.
30 with LaPlante-Cheate Bulldozer.
30 with Bros Hydraulic Bulldozer.
D4 with LaPlante-Cheate Angledozer.
D4 with Trackson High Lift.
D2 with LaPlante-Cheate Bulldozer.

Tractors

Eagle 4-wheeled, 3-4 plow, rubber-tired.
Cletrac Model E with power pulley.
T-20 International with Bucyrus-Erie
Angledozer.
Two 10-20 Internationals, rubber-tired.

Graders

77 Austin-Western.
99 Austin-Western.

Scrapers

Model J 12-yd. Carryall.
Euclid 6' and 6' Rotary.
Euclid 2-wheel trailer type.

Miscellaneous

Three Koehring Dumpsters with Cum-
mins Diesel Engines.
P & H Backfiller, completely rebuilt.
Foote No. 26 Paver.
Jaeger 75 Concrete Mixer, power hoist,
4 rubber heavy duty 6-ply tires.

THE CHAS. M. INGERSOLL CO.

19930 Detroit Road Rocky River, Ohio
Ellison 1010.

FOR SALE

WANTED TO BUY

- 1-10B Bucyrus-Erie Combination Back Hoe
- 1-15B Bucyrus-Erie Combination Back Hoe
- 1-Back Hoe for Model 331 Marion Shovel
- 1-10-ton, 3-Wheel Roller
- 1-Tamping Machine—Cleveland or equal
- 1-10- to 15-ton Carryall Trailer
- 1-25- to 30-ton Carryall Trailer
- 1-Bucket Loader — Barber-Greene or Hains, etc.
- 1-Steam Boiler—Vertical or locomotive type, approx. 50 H.P.
- 1-Bar Bender—Capacity up to 1½ bars (power operated)
- 1-Bar Cutter or Shear, capacity up to 1½ Bars (Power Operated).
- 1-Jackson or Whitman, or similar, Rolling Machine
- 1-Kelly or Whitman, or similar, Power Finisher
- 1-Earth Drill—Buda or similar
- 1-Air Compressor, approx. 300 to 400 cu. ft.

All Replies Should Give Following Information:

- (A) Age of machine
- (B) Shop or serial number
- (C) Present condition of entire machine, particularly motors and other mechanical parts
- (D) If possible send catalogue literature or snapshots describing each unit.

Send Reply to
P. O. Box 366, Youngstown, Ohio

ASPHALT EQUIPMENT

- 5—1½, 1 & 2 Ton Asphalt Plants.
- 3—½ Ton & 1 Ton Asphalt Mixers.
- 8—12,000 & 15,000 Gal. Cap. Tanks.
- 5—500 & 1,200 Gal. Distributor Trucks.
- 3—B. G. 842 & 848 Portable Plants.

R. C. STANHOPE, INC.

60 East 42nd St. New York 17, N. Y.

FOR SALE

6-2-Cu. Yd. high-discharge 1941 model Jaeger truck mixers at \$1250.00 each.

Also
1-Erie Type B Steam Shovel, \$2500.00.
1-Double drum, all electric THOMAS HOIST.
1-SAUERMAN dragline bucket, capacity 1 yard.

COLONIAL SUPPLY COMPANY

Thirteenth and Wilson Streets
P. O. Box 1798
Louisville, Kentucky

FOR SALE OR RENT

- 1-Bucyrus-Erie Model D2 Diesel Driven one cu. yd. Combination Shovel—Crane and dragline complete with 1 cu. yd. dipper bucket and 1 cu. yd. Page dragline bucket.
- 1-B2 Erie Steam Crane with 45 HP heavy duty boiler—40 ft. boom.

MAHONEY-CLARKE, INC.

217 Pearl Street New York 7, N. Y.

ASPHALT PLANTS

- 2 Ton Cummer Stationary.
- 1½ Ton Cedar Rapids Portable Diesel.
- 2-1000 lbs. Cummer Portable.
- 3-2500 and 10,500 bbl. Oil Tanks.

L. M. STANHOPE
304 Conestoga Road, Wayne, Penna.

HELP WANTED

TIRE REPAIRS

In all sizes of tractor, truck, wheelbarrow, passenger or 1800x24 tires.
An Equa-Flex "Sectional" repair constructed in your tire is guaranteed. Best results and prompt service!

It is a fact that we do repair run flat tires, passenger and truck, without a liner!

WALLACE TIRE SERVICE, Inc.
2320 S. Michigan Ave. Chicago, Ill.

FOR SALE

Brooks Load-Luggers, latest model CH-200, two yard buckets. Practically new. \$750.00

Dempster Dumpster, latest model 200-LF, two yard buckets mounted on International 2-ton 39. Perfect condition. \$1750.00

No. 206 P. & H. Gasoline Crane-Dragline, 35 ft. boom. Gone over. \$2500.00

Practically new 15x24" Diamond Portable Crushing plant with Cummings Diesel engine, elevator, screen. Been used 20,000 tons only. \$5000.00

M. WENZEL

2136 Jefferson Kansas City, Mo.

FOR SALE

Austin motor grader, shop No. 271 dual rear, single front. Hydraulic blade and scraper. Buda engine, run very little since overhauled. Bargain at \$1,150.00 FOB Rome, Georgia. Private Company selling. Box 160 Roads and Streets, 330 So. Wells St., Chicago 6, Ill.

FOR SALE

- 1-Ord Finishing Machine—20'-22'
- 1-Ord Finishing Machine—10'
- Power Take-off
- 1-42" Austin Elevating Grader with Power Take-off.
- 1-Adams 12 ft. Leaning Wheel Blade Grader
- 1-Austin Hydraulic 12-yd. Scraper
- 1-50 H.P. Cletrac (Crawler)—Gas

CHICAGO HEIGHTS COAL CO.
Chicago Heights, Illinois

FOR SALE

WHITE TRUCKS

Three five yard steel dumps
One flat rack
3½ ton motors, good condition

LYLE H. WHITE

1151 E. Culver St. Phoenix, Arizona

POSITIONS VACANT

DESIGNING ENGINEERS — DRAFTSMEN DETAILERS

Old established manufacturer of heavy construction and off highway hauling machinery doing very important war and post war work, needs men with experience in our type of production in engineering department. Excellent working conditions, prospects for steady employment, and opportunities for advancement. W. M. C. rules apply. Write Personnel Director, Koehring Company, 2026 West Concordia Avenue, Milwaukee 10, Wisconsin, giving complete personal data.

R. H. Foss New District Sales Manager for Hagard

Russell H. Foss was recently appointed district sales manager for the New York District of Hazard Wire Rope Division of American Chain & Cable Co., Inc. Mr. Foss, who has been with the company for 6 years, will continue to make his headquarters at 230 Park Ave., New York.

Industrial Equipment Company Represents P&H in Wider Area

The Industrial Equipment Company of Billings, Mont., formerly agents for P&H in all of Montana east of the Continental Divide, has also recently taken over the territory previously handled by Mountain Tractor Co. of Missoula. Industrial's representative in the new area is Frank Ruppel, widely known in construction machinery circles, with offices at Kalispel. As formerly, the agency is representing all P&H gasoline and diesel machines of $\frac{3}{4}$ to $2\frac{1}{2}$ cu. yd. capacity and maintains complete service facilities for equipment working in the state. Among other lines handled are International Harvester construction equipment and Bucyrus-Erie bulldozers and scrapers.

Henry Barnhart Promoted by Lima

Henry Barnhart, Manager of the Shovel and Crane Division of the Lima Locomotive Works, Inc., has been appointed Vice President in Charge of the Shovel and Crane Division. A. J. Townsend, Chief Mechanical Engineer of the Lima Locomotive Works, Inc., has been appointed Vice President in Charge of Engineering.

Pub. Wks. Congress Meeting

(Continued from page 70)

equipment doesn't meet special city needs.

A great diversity of snow removal problems were aired briefly under chairmanship of E. A. Wood of Winnipeg.

On Wednesday an Operational Panel meeting briefly covered sixteen topics ranging from public lighting to street maintenance. Papers were presented on the organization of public works departments by Robt. L. Anderson, Winnetka, Ill., Kenneth K. King, Kansas City, Mo., and Glenn C. Richards, Detroit. An open forum led by Weldon Weir, Asheville, N. C., closed the sessions.

At the banquet James P. Pope, Di-

rector of TVA, was the principal speaker. The Association's annual Veterans' Awards for municipal employment of 30 years or longer went to Herbert W. Kauffner, dir. of p.w., Durham, N. C.; Lyons Mussina, city

engineer, Williamsport, Pa.; Lawrence C. Whitsit, city engineer, Highland Park, Mich.; Guy B. Walker, city engineer, Wilkes-Barre, Pa.; and Wm. G. Helber, supt. of refuse disposal, Portland, Ore.

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